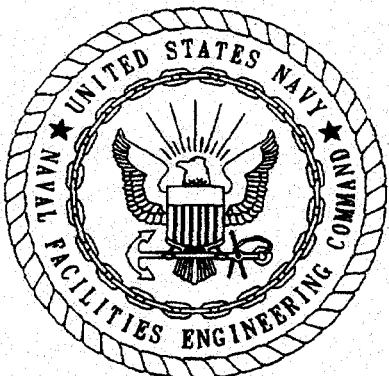


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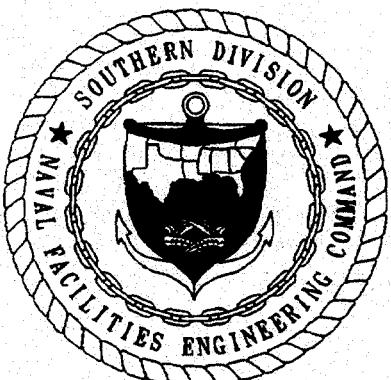
REMEDIAL INVESTIGATION FOR SITE 17 CRASH CREW TRAINING AREA NAS WHITING
FIELD FL
3/1/2000
HARDING LAWSON ASSOCIATES



**REMEDIAL INVESTIGATION
SITE 17, CRASH CREW TRAINING AREA
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

**UNIT IDENTIFICATION CODE: N60508
CONTRACT NO.: N62467-89-D-0317/116**

MARCH 2000



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA 29418**



Harding Lawson Associates
Engineering and Environmental Services
2590 Executive Center Circle East
Tallahassee, Florida 32301 - (850) 656-1293

1D 00778

**REMEDIAL INVESTIGATION REPORT
SITE 17, CRASH CREW TRAINING AREA
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

Unit Identification Code: N60508

Contract No.: N62467-89-D-0317/116

Prepared by:

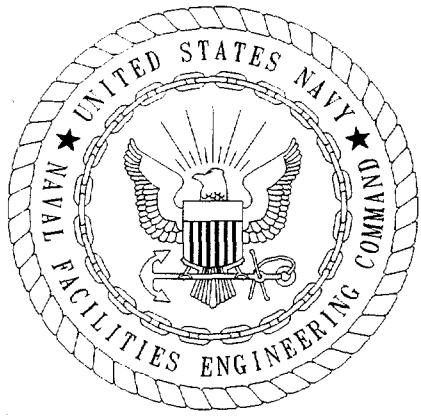
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Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418**

Linda Martin, Code 1859, Engineer-in-Charge

March 2000



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

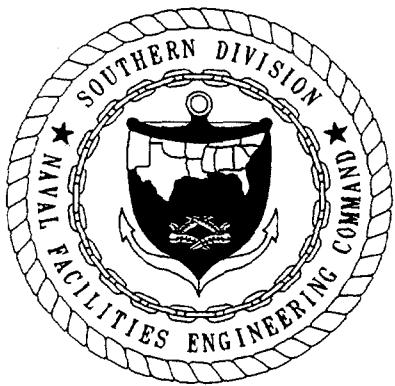
The Contractor, Harding Lawson Associates, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/116 are complete and accurate and comply with all requirements of this contract.

DATE: March 27, 2000

NAME AND TITLE OF CERTIFYING OFFICIAL: Rao Angara
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Eric Blomberg, P.G.
Project Technical Lead

(DFAR 252.227-7036)



FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation and Recovery Act (RCRA), and the Hazardous and Solid Waste Amendments (HSWA) of 1984. These acts establish the means to assess and clean up hazardous waste sites for both private-sector and Federal facilities. The CERCLA and SARA form the basis for what is commonly known as the Superfund program.

Originally, the Navy's part of this program was called the Naval Assessment and Control of Installation Pollutants (NACIP) program. Early reports reflect the NACIP process and terminology. The Navy eventually adopted the program structure and terminology of the standard IR program.

The IR program is conducted in several stages as follows:

- preliminary assessment (PA)
- site inspection (SI) (formerly the PA and SI steps were called the initial assessment study under the NACIP program),
- remedial investigation and feasibility study, and
- remedial design and remedial action (RD/RA).

The Southern Division, Naval Facilities Engineering Command manages and the U.S. Environmental Protection Agency and the Florida Department of Environmental Protection (formerly Florida Department of Environmental Regulation) oversee the Navy environmental program at Naval Air Station (NAS) Whiting Field. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the CERCLA program at NAS Whiting Field should be addressed to Ms. Linda Martin, Code 1859, at (843) 820-5574.

EXECUTIVE SUMMARY

A remedial investigation and feasibility study (RI/FS) is being conducted at Naval Air Station (NAS) Whiting Field in Milton, Florida, by Southern Division, Naval Facilities Engineering Command as part of the Department of Defense Installation Restoration (IR) program. The IR program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations.

A phased approach was implemented to conduct the RI. Phase I was completed in August 1992. The subsequent phases of the RI were designated as Phase IIA and Phase IIB. Fieldwork for Phase IIA was completed in March 1994. RI Phase IIB was completed in November 1996.

This RI report contains the results of assessment activities used to characterize site-specific chemicals detected in environmental media (surface soil, subsurface soil, and groundwater) at Site 17, Crash Crew Training Area, at NAS Whiting Field. Data obtained from these activities were used to evaluate the nature and extent of contamination at the site and support feasibility studies (if required) and baseline risk assessments. Human health and ecological baseline risk assessments are included with the RI report.

The fieldwork conducted during the RI included the following tasks:

- surface soil sampling,
- subsurface soil sampling,
- monitoring well installation,
- groundwater sampling, and
- hydrogeologic investigations.

Soil and groundwater samples were analyzed for target compound list organic analytes and target analyte list (TAL) inorganic analytes.

The following conclusions are based on results of the RI activities at Site 17, Crash Crew Training Area, NAS Whiting Field.

- Organic analytes detected in surface soil samples consist of seven volatile organic compound (VOCs), four semivolatile organic compound (SVOCs), and total recoverable petroleum hydrocarbons (TRPH). Five VOCs (ethylbenzene, methylene chloride, toluene, trichloroethene, and total xylenes) and one SVOC (naphthalene) exceeded Chapter 62-777, Florida Administrative code (FAC), leachability soil cleanup target levels (SCTLs). TRPH exceeded the Chapter 62-777, FAC, residential, industrial, and leachability SCTLs. No pesticides or polychlorinated biphenyl (PCBs) were detected in the surface soil sample collected from Site 17.
- Twenty target analyte list inorganic analytes were detected in the surface soil samples. Ten analytes (aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, manganese, and vanadium) exceeded either the U.S. Environmental Protection Agency Region III residential soil screening values or Chapter 62-777, FAC, residential and leachability SCTLs.

- Organic analytes detected in subsurface soil samples consist of three VOCs, two SVOCs, and two pesticides or PCBs. No VOCs, SVOCs, pesticides, or PCBs exceeded Florida or Federal residential or industrial screening criteria.
- TRPH was detected in 4 of 19 subsurface soil samples and no duplicates. None of the samples exceeded the Chapter 62-777, FAC, industrial and leachability SCTLs.
- Twenty-three inorganic analytes were detected in the subsurface soil samples. Three inorganic analytes (arsenic, chromium, and iron) exceeded either the USEPA Region III industrial RBCs or Chapter 62-777, FAC, industrial and leachability SCTLs. Arsenic was detected in four subsurface soil samples at concentrations that exceeded the State and Federal industrial screening criteria.
- Phase IIA groundwater analytical data are not representative of the conditions at Site 17; therefore, the data are not evaluated in this report.
- During the Phase IIB groundwater investigation, one VOC, carbon disulfide, was detected in one sample (17G00301) at an estimated concentration of 2 micrograms per liter ($\mu\text{g/l}$). No SVOCs, pesticides, or PCBs were detected in groundwater samples collected from monitoring wells WHF-17-1, WHF-17-1S, WHF-17-2, or WHF-17-3 during Phase IIB.
- Seventeen inorganic analytes including aluminum, barium, beryllium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc were detected in groundwater samples collected from monitoring wells (WHF-17-1, WHF-17-1S, WHF-17-2, and WHF-17-3) during Phase IIB. Two inorganic analytes, aluminum and iron, collected in July 1997 had concentrations that exceeded either the Chapter 62-777, FAC, groundwater cleanup target levels or Federal maximum contaminant level (MCLs).
- The human health chemicals of potential concern (HHCPs) detected in surface soil do not pose unacceptable carcinogenic risks to the receptors evaluated based on USEPA risk criteria.
- The HHCPs detected in subsurface soil and groundwater do not pose unacceptable carcinogenic risks to the receptors evaluated based on USEPA and Florida Department of Environmental Protection (FDEP) risk criteria.
- The total estimated lifetime cancer risk at Site 17 associated with ingestion of soil by a hypothetical future resident exceeds Florida's target risk level of concern 1×10^{-6} due primarily to arsenic.
- The surface soil carcinogenic risks at Site 17 are driven by arsenic. The arsenic in site soil appears to be at naturally occurring levels. The arsenic exposure point concentration for surface soil was 2.8 milligrams per kilogram (mg/kg), which is below the background sures

to arsenic in background (nonsite) soils are actually higher than risk from possible exposure to arsenic at Site 17 soils.

- Noncancer risk levels for soil, subsurface soil, and groundwater meet the USEPA and FDEP target hazard index of one.
- The central tendency risks to a hypothetical future resident meet the Florida level of concern (1×10^{-6}). Central tendency and reasonable maximum exposure (RME) residential risks provide the risk managers and decision makers with a perspective of the true hypothetical risk range to future residents.
- Sublethal risks (i.e., potential reductions in the reproduction and growth of terrestrial wildlife) associated with the ingestion of cadmium in surface soil and food items are predicted for small mammals and birds at Site 17.
- Although RME concentrations of cadmium and lead exceeded their respective benchmark values, CT exposure concentrations of these constituents were below the benchmark values. In addition, no evidence of stressed vegetation outside of the burn pits was observed at Site 17. Therefore, it is unlikely that plant cover and/or biomass at Site 17 would be reduced such that small mammals and birds would be affected.
- Reduction in invertebrate biomass across the entire Site 17 area is not expected to occur.
- Only sublethal risks associated with ingestion of cadmium in surface soil and food items are predicted for small mammals and birds at Site 17.
- In February 1999, Bechtel Environmental, Inc. completed a time-critical interim remedial action (IRA) at Site 17. The objective of the IRA was to reduce the arsenic and the total recoverable petroleum hydrocarbons (TRPH) exposure risk to potential industrial or residential receptors at the site. The IRA consisted of the placement of a permeable soil layer and vegetative cover over areas where surface soil arsenic and TRPH concentrations exceeded the Florida Department of Environmental Protection (FDEP) industrial soil cleanup target levels (SCTLs).

Based on the interpretation of findings from the RI activities, a focused feasibility study is recommended to address potential risk of a surface soil exposure by a hypothetical future aggregate resident. The calculated risk to a hypothetical resident (2×10^{-6}) exceeded Florida's target level due to arsenic.

Although groundwater analytical results, summaries, and conclusions are included in this RI report, the groundwater at NAS Whiting Field has been designated as a separate site (Site 40, Facilitywide Groundwater). Therefore, chemicals in the groundwater that pose a threat to human and/or ecological receptors will be evaluated as part of the Site 40 RI/FS.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AFFF	aqueous film-forming foam
ARAR	applicable or relevant and appropriate requirement
AVGAS	aviation gasoline
BAF	bioaccumulation factor
bls	below land surface
°C	degrees Celsius
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CPC	chemical of potential concern
cm/sec	centimeters per second
CT	central tendency
DDT	dichlorodiphenyltrichloroethane
DQO	data quality objective
ECPC	ecological chemical of potential concern
ELCR	excess lifetime cancer risk
EPC	exposure point concentration
ERA	ecological risk assessment
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
ft/day	feet per day
ft ² /day	square feet per day
ft/ft	feet per foot
GCTL	groundwater cleanup target level
GIR	General Information Report
HHCPC	human health chemical of potential concern
HHRA	human health risk assessment
HI	hazard index
HLA	Harding Lawson Associates
HQ	hazard quotient
HRS	Hazard Ranking System
IAS	Initial Assessment Study
IDL	instrument detection limit
IR	Installation Restoration
IRIS	Integrated Risk Information System
JP-5	jet propellant 5
K _{oc}	carbon partition coefficient
K _d	distribution coefficient

GLOSSARY (Continued)

LDC	Laboratory Data Consultants, Inc.
LD ₅₀	lethal dose to 50 percent of test population
LOAEL	lowest observed adverse effects level
MCL	maximum contaminant level
MS/MSD	matrix spike and matrix spike duplicate
mg/kg	milligrams per kilogram
µg/l	micrograms per liter
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NOAEL	no observable adverse effects level
NPL	National Priority List
NTU	nephelometric turbidity unit
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbons
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PDE	potential dietary exposure
%D	percent difference
%RSD	percent relative standard deviation
PVC	polyvinyl chloride
QAPP	Quality Assurance Program Plan
QC	quality control
RBC	risk-based concentration
RGO	remedial goal option
RI	Remedial Investigation
RI/FS	remedial investigation and feasibility study
RME	reasonable maximum exposure
RPD	relative percent difference
RRF	relative response factor
RTECS	Registry of Toxic Effects of Chemical Substances
RTV	reference toxicity value
SARA	Superfund Amendments and Reauthorization Act
SCTL	soil cleanup target level
SDG	sample delivery group
SFF	site foraging frequency
SI	site inspection
SOUTHNAV-	
FACENGCOM	Southern Division, Naval Facilities Engineering Command
SQL	sample quantitation limit
SU	standard unit
SVOC	semivolatile organic compound

GLOSSARY (Continued)

TAL	target analyte list
TCL	target compound list
TRPH	total recoverable petroleum hydrocarbons
UCL	upper confidence limit
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Harding Lawson Associates (HLA), under contract to the Department of Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGC) is submitting a Remedial Investigation (RI) report for Site 17, Crash Crew Training Area at Naval Air Station (NAS) Whiting Field located in Milton, Florida. The RI report for Site 17 is one in a series of site-specific reports being completed in conjunction with the NAS Whiting Field General Information Report (GIR) (HLA, 1998) to summarize the previous investigations and to present the results of the RI.

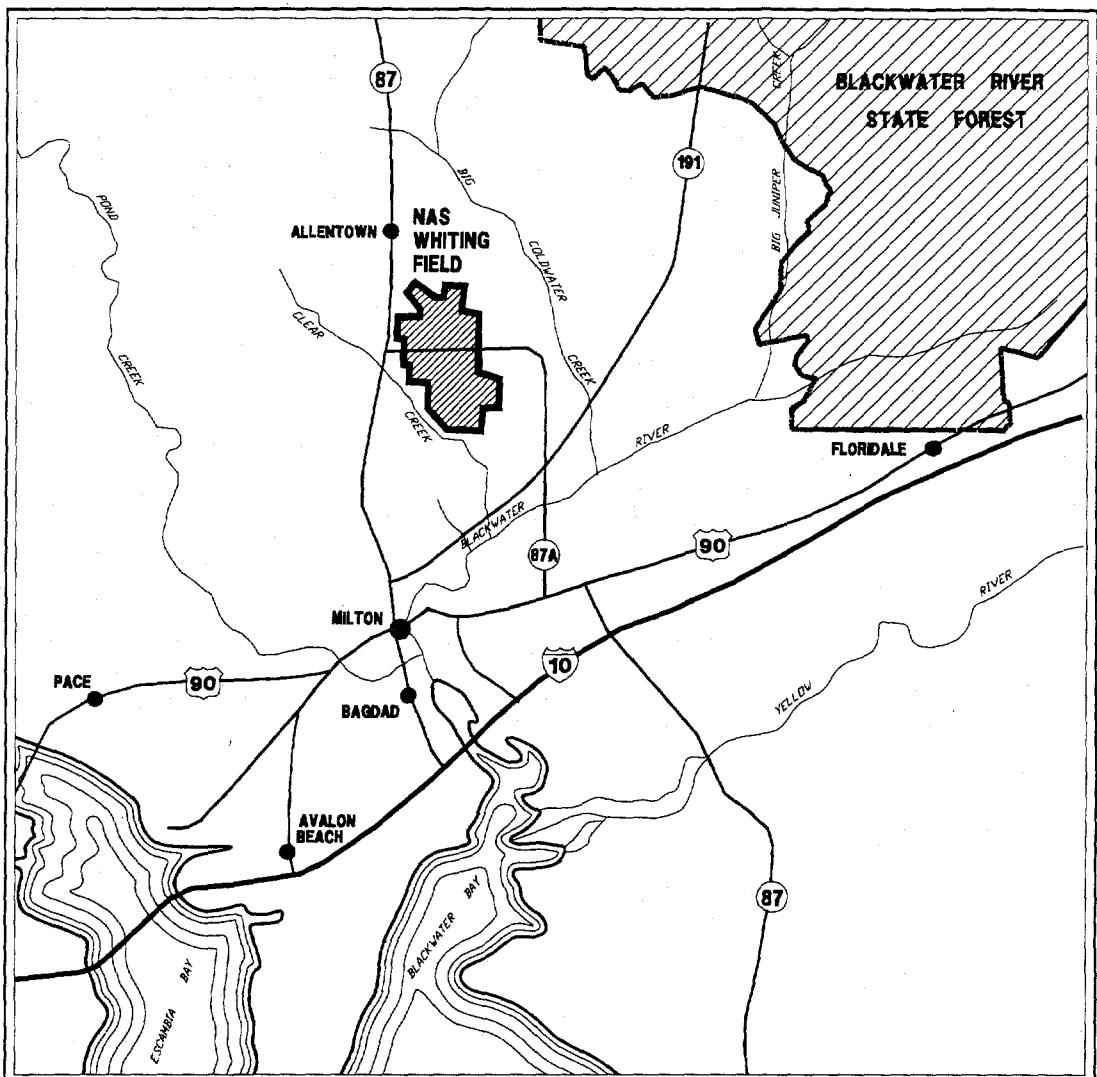
NAS Whiting Field is located in Santa Rosa County, in Florida's northwest coastal area, approximately 7 miles north of Milton and 20 miles northeast of Pensacola (Figure 1-1). NAS Whiting Field presently consists of two air fields separated by an industrial area. The installation is approximately 2,560 acres. Figure 1-2 presents the installation layout and locations of remedial investigation and feasibility study (RI/FS) sites at NAS Whiting Field. A complete description of historic operations at the facility is presented in Section 1.3 of the NAS Whiting Field GIR (HLA, 1998).

The RI/FS is being conducted on behalf of the Navy at NAS Whiting Field under contract No. N62467-89-D-0317. The RI was conducted in three phases. The Phase I RI field program was completed in May 1992. The Phase IIA RI field program was conducted between May 1992 and March 1994. The Phase IIB RI field program was completed in November 1996.

In 1999, Bechtel Environmental, Inc. (BEI), performed a time-critical interim remedial action (IRA) at Site 17. The objective of the IRA was to reduce the arsenic and the total recoverable petroleum hydrocarbons (TRPH) exposure risk to potential industrial or residential receptors at the site. The IRA consisted of the placement of a permeable soil layer and vegetative cover over areas where surface soil arsenic and TRPH concentrations exceeded the Florida Department of Environmental Protection (FDEP) industrial soil cleanup target levels (SCTLs). Details of the IRA are presented in Appendix F.

Pre-construction soil sampling was conducted in October and November 1998 to delineate and minimize the site restoration area. A two-foot thick permeable soil layer was constructed to cover the contaminated surface soil. The soil cover consisted of an 18-inch thick red sandy base with a 6-inch thick brown fill for topsoil. In February 1999, approximately 8,480 cubic yards of clean fill was used to construct the 61,150 square foot soil cover. Bahia grass sod was then installed as a vegetative cover and the restoration site grade was surveyed. The *Removal Action/Completion Report for Sites 9, 10, 17, 18, and 31C* (BEI, 1999) contains further details regarding the surface-soil contamination removal actions.

1.1 PURPOSE OF THE RI/FS. The purpose of the RI is to identify and characterize the nature and extent of chemicals in environmental media and potential risks to human and ecological receptors that might be posed by toxic or hazardous substances. The chemicals were potentially released to the environment during past waste disposal practices or spills. The data collected during the RI field program will also be used in an FS (if necessary) to screen, evaluate, and select



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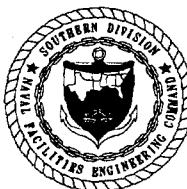
MAP LOCATION

Source: ABB Environmental Services Inc., 1992b

NOTE
NAS = Naval Air Station

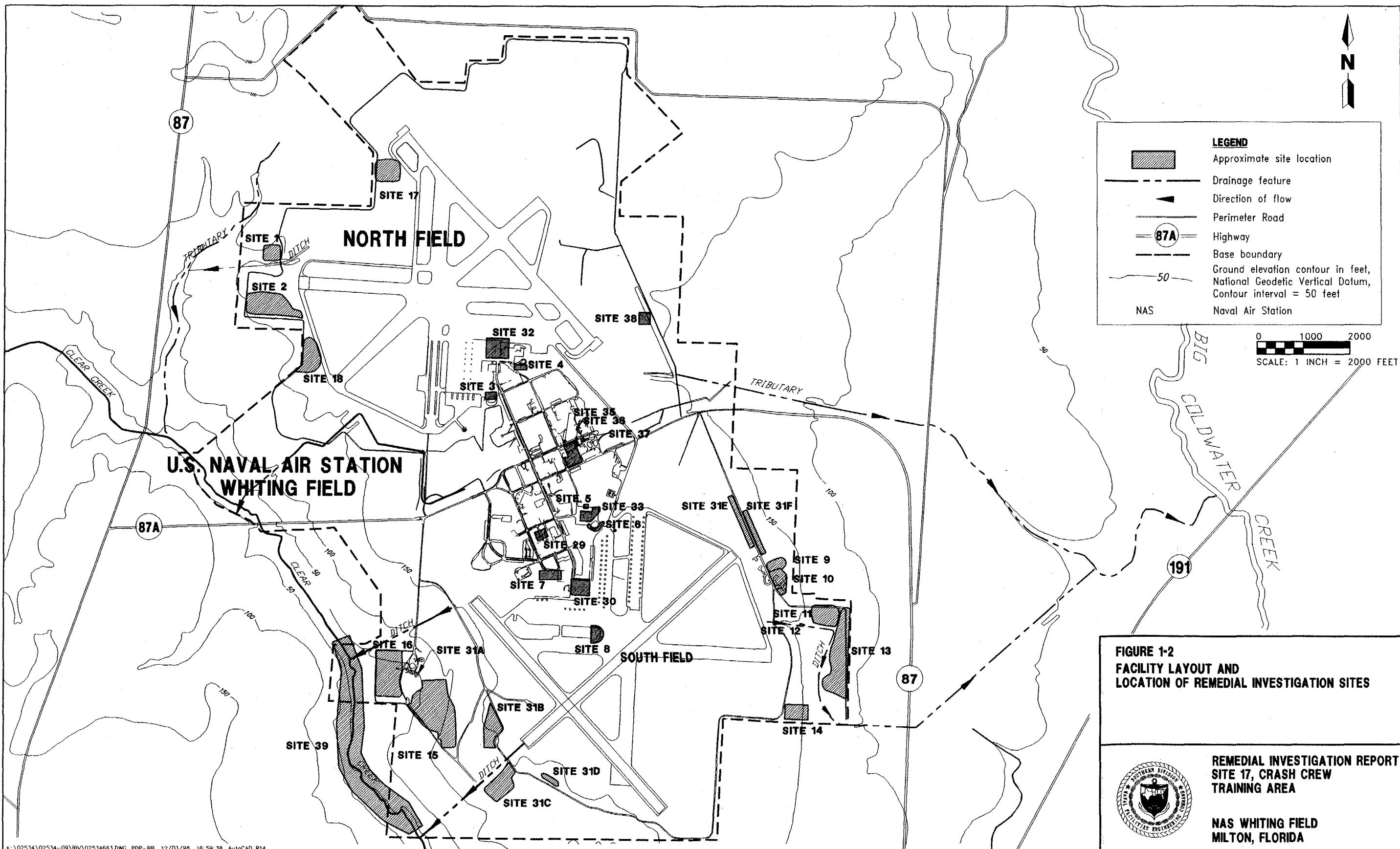
FIGURE 1-1
FACILITY LOCATION MAP

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**REMEDIAL INVESTIGATION
SITE 17, CRASH CREW
TRAINING AREA**

**NAS WHITING FIELD
MILTON, FLORIDA**



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remedial alternatives to provide permanent, feasible solutions to environmental impacts that may be a result of past waste disposal practices or spills.

1.2 SITE DESCRIPTION. Background information was gathered from the Initial Assessment Study (IAS) (Envirodyne Engineers, Inc., 1985). Site 17 is located along the northwestern facility boundary and near the North Air Field taxiway. The site is approximately 4 acres (Figure 1-2) in size and was in use between 1951 and 1991. Site 17 is composed of multiple shallow depressions where metallic objects were placed to simulate an aircraft after a crash. Crash crew training activities consisted of pouring approximately 100 gallons of aviation gasoline (AVGAS) or jet fuel into the depressions and then igniting it. The fires were then extinguished using an aqueous film-forming foam (AFFF) as part of crash crew training exercises (Geraghty & Miller, 1986).

Investigators conducting soil sampling during Phase IIA in 1992 collected samples in a linear area they suspected was a channel of overland flow oriented to the southwest. Neither the suspected areas nor their boundaries are currently discernable. This change may have been a result of the removal of the fuel tanks and aircraft bodies from the burn pits, after which earth-moving equipment spread the rim of mounded soil from around the burn pit depressions to the adjacent surrounding areas in September 1994. During the IRA in February 1999, contaminated areas of the site were covered with 2 feet of soil and sod was placed over the soil cover. Currently, the site is maintained as an open grassy field. This site has a slight surface gradient that slopes gently toward the southwestern site boundary.

According to the U.S. Department of Agriculture (USDA) (USDA, 1980), the surficial soil horizon at Site 17 is classified as Troup loamy sand and Orangeburg sandy loam. There is no evidence of a clay soil cap over the site area. Because the soil at the site is predominantly silty sand, much of the on-site rainfall infiltrates directly into the soil. Currently the depressions hold surface water runoff 6 to 12 inches deep most of the time.

Current site conditions do not indicate the occurrence of overland flow or surface water moving off site.

1.3 REGULATORY SETTING. The Navy Installation Restoration (IR) program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations. The IR program is the Navy response authority under Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires that Federal facilities comply with the act, both procedurally and substantively. SOUTHNAVFACENGCOM is the agency responsible for the Navy IR program in the southeastern United States. Therefore, SOUTHNAVFACENGCOM has the responsibility to process NAS Whiting Field through preliminary assessment, site inspection (SI), RI/FS, and remedial response selection in compliance with the guidelines of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300).

Section 105(a)(8)(A) of SARA requires the U.S. Environmental Protection Agency (USEPA) to develop criteria to set priorities for remedial action for chemicals

detected in environmental media based on relative risk to human health and the environment. To meet this requirement, USEPA has established the Hazard Ranking System (HRS) as Appendix A to the NCP. First promulgated in 1982, the HRS was amended in December 1990, effective March 14, 1991 (55 Federal Register No. 241:51532-51667), to comply with requirements of Section 105(c)(1) of SARA to increase the accuracy of the assessment of relative risk. The HRS (March 1991) has been substantially revised and is designed to prioritize sites after the SI phase of the CERCLA process.

The HRS score for NAS Whiting Field was generated in 1993. The score was sufficient to place NAS Whiting Field on the National Priority List (NPL).

In January 1994, the USEPA placed NAS Whiting Field on a proposed list of sites to be included on the NPL (40 CFR 300, Federal Register, January 18, 1994), and on May 31, 1994, NAS Whiting Field was placed on the NPL effective June 30, 1994 (40 CFR 300, Federal Register, May 31, 1994). As a result, the RI/FS for NAS Whiting Field must follow the requirements of the NCP, as amended by SARA, and regulatory guidance for conducting RI/FS programs under CERCLA.

1.4 REPORT ORGANIZATION. The RI report is organized into 10 chapters (Chapters 1.0 to 10.0). Chapter 1.0 presents the purpose, site description, and regulatory setting for the RI at NAS Whiting Field. Chapter 2.0 summarizes previous investigations. Chapter 3.0 presents the investigative methodology for conducting the assessment. Chapter 4.0 presents the site-specific data quality assessment. Chapter 5.0 discusses the investigative results of the assessment. Chapter 6.0 presents the Human Health Risk Assessment (HHRA) and Chapter 7.0 presents the Ecological Risk Assessment (ERA). Chapter 8.0 discusses the fate and transport of chemicals determined to be human and/or ecological chemicals of potential concern. Chapter 9.0 provides a summary of the conclusions and recommendations. Chapter 10.0 presents the professional review certification.

2.0 PREVIOUS INVESTIGATIONS

This chapter summarizes the previous investigations at Site 17, Crash Crew Training Area at NAS Whiting Field. An initial facilitywide investigation began with the Phase I or IAS completed in 1985 by Envirodyne Engineers (Envirodyne Engineers, 1985). The IAS investigation included Sites 1 through 16. Site 17 had not yet been identified as a potential site and was not part of the IAS.

2.1 CONFIRMATION STUDY. After the IAS was completed, 15 of the original 16 sites warranted further investigation in a confirmation study. Sites 17 and 18 were added to this confirmation study on December 17, 1985, at the request of the Florida Department of Environmental Regulation, currently the Florida Department of Environmental Protection (FDEP). Confirmation studies typically consist of two parts: verification and characterization. The verification study involves on-site investigation to confirm the presence and extent of contamination and to evaluate the necessity of conducting mitigating actions or cleanup operations. The verification study for Site 17 was initially addressed in Phase II (Geraghty and Miller, 1986).

2.2 VERIFICATION STUDY. Geraghty & Miller gathered background information by conducting a record search, performing an on-site survey, conducting interviews, installing one monitoring well (WHF-17-1), and collecting a groundwater sample (Geraghty & Miller, 1986). The monitoring well was installed to a depth of 152 feet below land surface (bls) along the western edge of the site and was determined to be located hydraulically crossgradient to the site (ABB Environmental Services, Inc. [ABB-ES], 1995a). The groundwater sample was analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, herbicides (2,4-D and 2,4,5-TP Silvex), polychlorinated biphenyls (PCBs), and metals. Only one SVOC, bis(2-ethylhexyl)phthalate, and two inorganic analytes were detected. Lead and mercury were detected at concentrations below Florida's primary drinking water regulations in 1986.

The verification study recommended additional work be performed based on the types of wastes (jet propellant 5 [JP-5]) possibly disposed of at the site, the potential for off-site migration, and the presence of human and ecological receptors.

The characterization study was not completed because the RI/FS was modified in 1987 and 1988 to be congruent with CERCLA and SARA (HLA, 1998).

3.0 FIELD INVESTIGATIVE METHODS

Field investigative techniques used to collect the data are described in the RI/FS Sampling and Analysis Plan, Volume II (E.C. Jordan, 1990).

Field and laboratory quality assurance and quality control (QC) requirements for the RI activities comply with the RI/FS Quality Assurance Program Plan (QAPP) located in Appendix A (Site Management Plan) of the RI/FS Sampling and Analysis Plan, Volume II (E.C. Jordan, 1990). Health and safety requirements are in accordance with the general Data Management and Health and Safety Plan located in Volume III of the *Remedial Investigation and Feasibility Study Planning Document, NAS Whiting Field, Milton, Florida* (E.C. Jordan, 1990).

Field investigative methods where applicable were superseded or, if not covered in the documents identified above, are described in RI/FS Technical Memorandum No. 7, *Phase IIB Workplan* (ABB-ES, 1995b) and in the NAS Whiting Field GIR (HLA, 1998).

These field and laboratory investigation techniques are in general conformance with USEPA standard operating procedure (USEPA, 1991a and 1996a) and were followed during the RI sampling and analysis program.

The RI Phase IIA investigation (ABB-ES, 1992a) at Site 17 consisted of collecting 34 surface soil samples and 19 subsurface soil samples, installing 3 monitoring wells, and collecting four groundwater samples. The Phase IIB investigation consisted of collecting four groundwater samples.

The following provides a brief description of the number and types of environmental samples and the analytical methodology for the RI for Site 17, Crash Crew Training Area.

3.1 SURFACE SOIL ASSESSMENT. The surface soil assessment included the collection of 34 surface soil samples, 17-SL-01 through 17-SL-34. These samples were collected in August 1992 at locations in and around the seven burn pit areas, one stained area, and areas of suspected overland flow (Areas A-K, Figure 3-1) that were associated with the former firefighting training activities.

Surface soil sample depths were based on organic vapor analyzer readings; however, all surface soil samples were collected from depths of less than 8 inches b.s. The surface soil samples were collected using a decontaminated stainless steel auger (USEPA, 1991a). Soil samples were described using the Unified Soil Classification System and recorded in a bound field logbook. The surface soil samples were analyzed for Contract Laboratory Program (CLP) (Naval Energy and Environmental Support Activity [NEESA] Level D) target compound list (TCL) VOCs, SVOCs, pesticides, PCBs, target analyte list (TAL) inorganic analytes, and total recoverable petroleum hydrocarbons (TRPH). The surface soil sampling results are discussed in Section 5.3 of this report.

3.2 SUBSURFACE SOIL ASSESSMENT. The subsurface investigation at Site 17 included the advancement of nine soil borings (17SB01 through 17SB09) and the installation

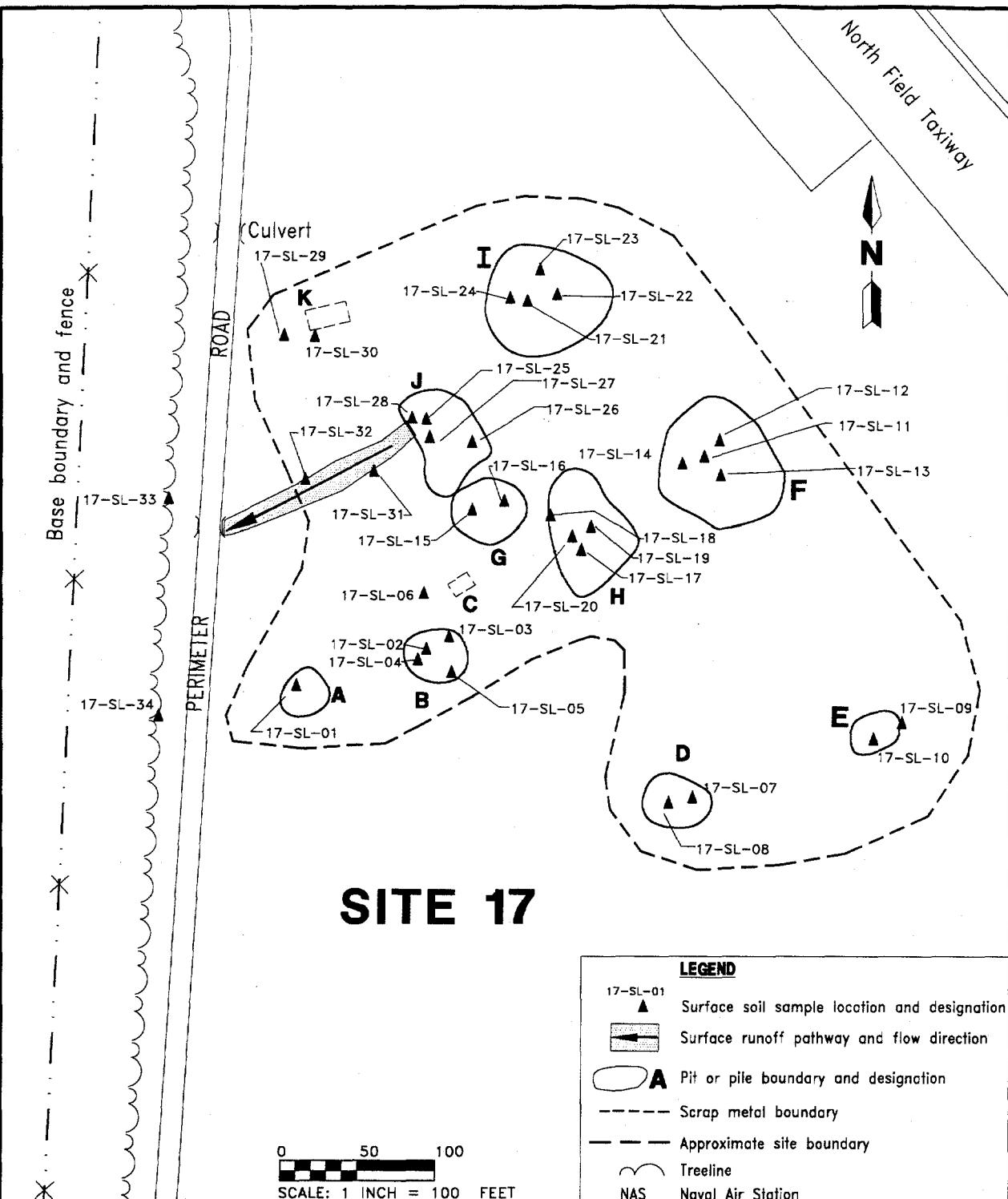


FIGURE 3-1
SURFACE SOIL SAMPLING LOCATIONS

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of three groundwater monitoring wells (WHF-17-1S, WHF-17-2, and WHF-17-3) (Figure 3-2). Nineteen subsurface soil samples were collected using a split-spoon sampler. Lithologic data were recorded during the advancement of the soil borings and the installation of the groundwater monitoring wells. Split-spoon samples were typically collected at 5-foot intervals during drilling of the soil borings and monitoring wells as described in Paragraph 2.1.4.5 of the GIR (HLA, 1998). Monitoring well installations were conducted in conjunction with the hydrogeologic and groundwater investigations (summarized in Technical Memoranda 4 and 5, respectively [ABB-ES, 1995c and 1995d]). Lithologic descriptions for monitoring wells WHF-17-1, WHF-17-1S, WHF-17-2, and WHF-17-3 are presented in Appendix B.

3.3 HYDROGEOLOGIC ASSESSMENT. The hydrogeologic assessment utilized data from Site 17 and three adjacent sites investigated during the RI field program. The adjacent sites investigated included Site 1 (Northwest Disposal Area), Site 2 (Northwest Open Disposal Area), and Site 18 (another Crash Crew Training Area). The hydrogeologic field investigation activities consisted of collecting water-level data from 15 monitoring wells to develop potentiometric surface maps and estimate the horizontal and vertical groundwater gradients in the site vicinity. Groundwater seepage velocity data were collected by conducting slug tests on four monitoring wells. Monitoring well construction details for these sites are presented in Table 3-1. Results of the hydrogeologic investigation are presented in Section 5.2 of this report.

3.4 GROUNDWATER ASSESSMENT. Groundwater assessment included collecting groundwater samples from monitoring wells WHF-17-1, WHF-17-1S, WHF-17-2, and WHF-17-3 (Figure 3-3) on October 19 through 21, 1993 (Phase IIA) and again July 18, 1996 (Phase IIB). During Phase IIA, the groundwater samples were collected using a Teflon™ bailer after purging the four monitoring wells with a submersible or bladder pump. The groundwater samples were analyzed for CLP (NEESA Level C) TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganics.

During Phase IIB, the groundwater samples were collected from the four monitoring wells and analyzed for CLP (NEESA Level D) TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganics. Inorganic samples were not filtered during sample collection.

Analyses were also conducted to assess secondary water quality parameters and provide data for assessing remedial alternatives in the FS. The analyses included alkalinity, chloride, sulfates, color, hardness, ammonia nitrates, total Kjeldahl nitrogen, nitrate and nitrite, pH, phosphorous, total dissolved solids, and sulfides.

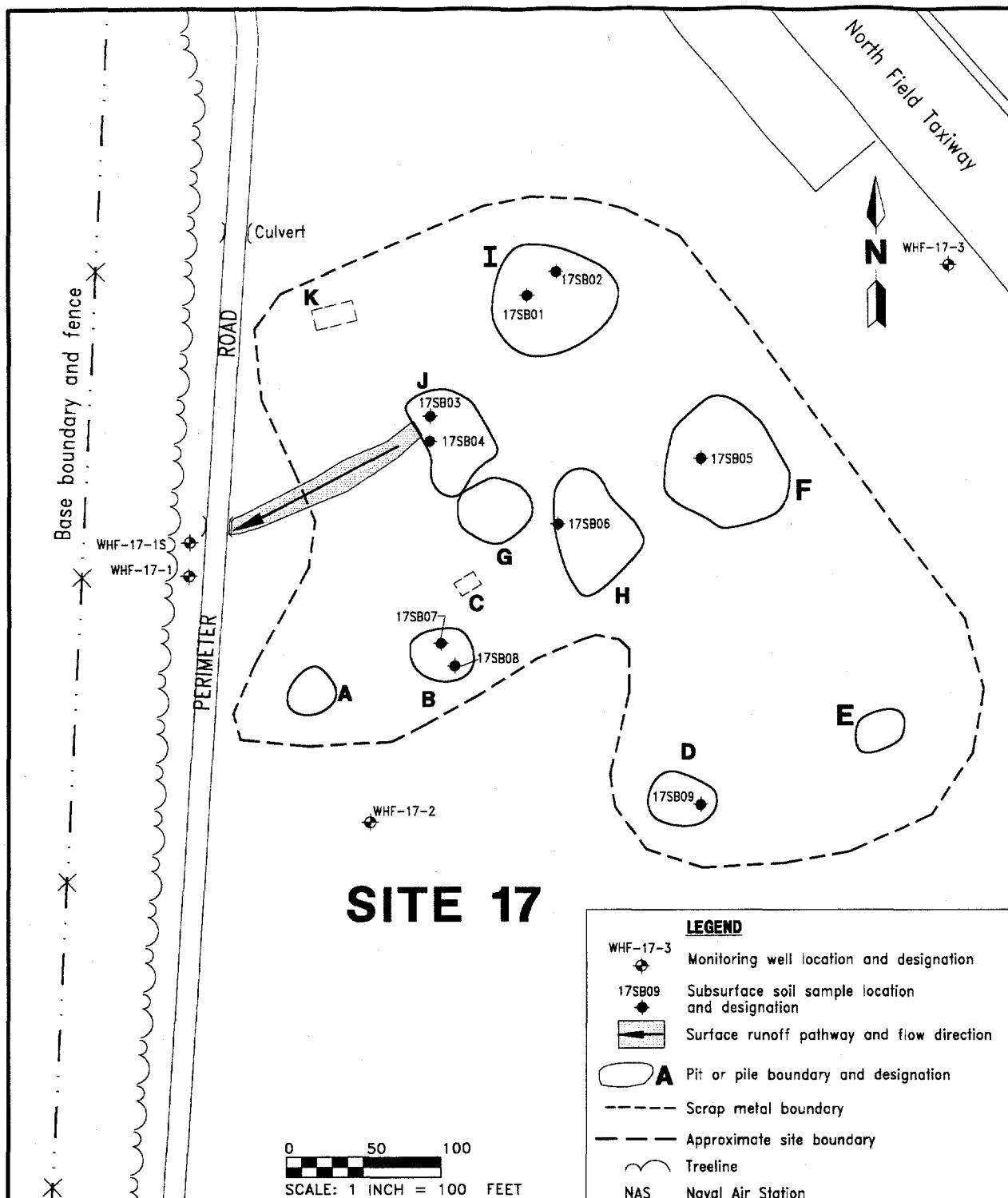


FIGURE 3-2
SUBSURFACE SOIL SAMPLING LOCATIONS

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Table 3-1
Summary of Monitoring Well Construction Details

Remedial Investigation Report
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Monitoring Well Designation	RI Phase of Well Completion	Well Diameter (inches)	Land Surface Elevation (feet msl)	TOC Elevation (feet msl)	Total Well Depth (feet BTOC)	Approximate Screen Interval (feet BTOC)
<u>Northwest Disposal and Crash Crew Training Areas</u>						
<u>Site 1, Northwest Disposal Area</u>						
WHF-1-1	VS	4	140.49	142.62	123.00	113 to 123
WHF-1-1S	IIA	2	140.54	143.08	75.40	60 to 75
WHF-1-2	IIA	2	142.59	145.61	78.80	63 to 78
WHF-1-3	IIA	2	152.95	155.50	87.48	72 to 87
WHF-1-4	IIB	2	NA	151.86	79.30	70 to 80
<u>Site 2, Northwest Open Disposal Area</u>						
WHF-2-1	IIA	2	148.48	150.80	87.42	72 to 87
WHF-2-2	IIB	2	NA	159.16	91.70	84 to 94
WHF-2-3	IIB	2	NA	160.63	91.60	83 to 93
<u>Site 17, Crash Crew Training Area</u>						
WHF-17-1	VS	4	192.61	194.71	159.00	149 to 159
WHF-17-1S	IIA	2	192.48	194.96	115.50	100 to 115
WHF-17-2	IIA	2	194.33	197.35	121.90	106 to 121
WHF-17-3	IIA	2	198.89	201.21	126.50	111 to 126
<u>Site 18, Crash Crew Training Area</u>						
WHF-18-1	VS	4	161.56	163.57	120.20	110 to 120
WHF-18-2	IIA	2	162.15	164.75	107.86	92 to 107
WHF-18-3	IIA	2	172.73	175.64	112.90	97 to 112
<p>Notes: RI = Remedial Investigation. msl = mean sea level. TOC = top of casing. BTOC = below top of casing. VS = Verification Study. IIA = Remedial Investigation Phase IIA. IIB = Remedial Investigation Phase IIB. NA = not available.</p>						

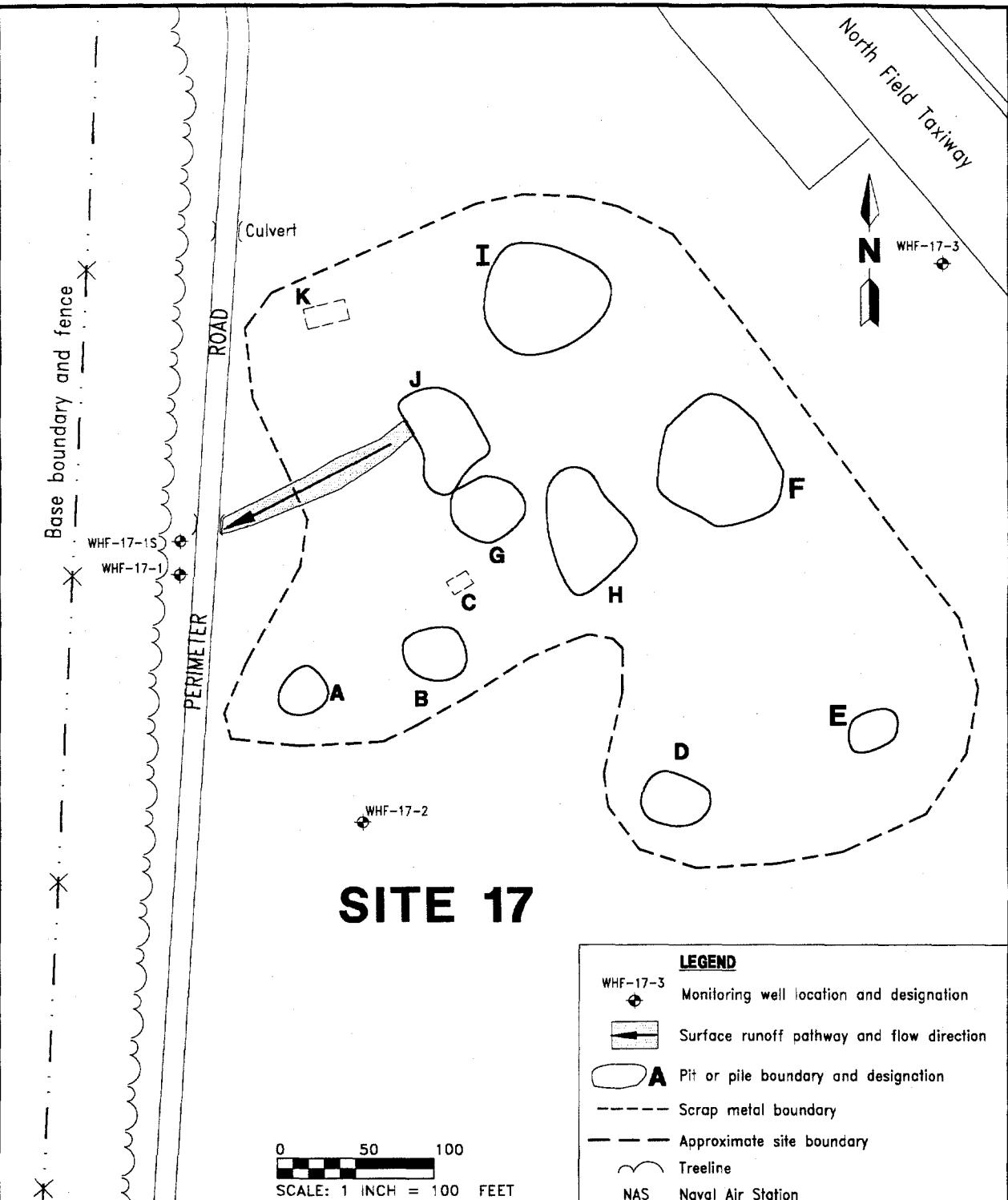


FIGURE 3-3
MONITORING WELL LOCATION MAP

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4.0 SITE-SPECIFIC DATA QUALITY ASSESSMENT

This chapter describes how the groundwater data generated during Phase IIB of the RI at Site 17 were managed and evaluated. Data Quality Assessments for the Phase IIA investigation are presented in Technical Memoranda 3 and 5 for soil and groundwater, respectively (ABB-ES, 1995e and 1992a). Site 17 groundwater samples were collected in association with Site 1 where duplicate samples were collected. Duplicate samples were not collected at Site 17; therefore, the following evaluation utilizes Site 1 groundwater data, which is associated with data from Site 17. Section 4.1 describes the analytical program and data management. Section 4.2 summarizes the precision, accuracy, representativeness, completeness, and comparability (PARCC) report on the data. Section 4.3 presents a summary of the Data Quality Assessment. No soil samples were collected during the Phase IIB investigation. The PARCC report is presented in Appendix A (Quality Control Data) of this report.

Groundwater samples collected during Phase IIA of the RI were qualified according to USEPA functional guidelines for evaluation of organic (USEPA, 1991b) and inorganic (USEPA, 1988) analytical data analyzed using USEPA CLP protocol. The data quality objective (DQO) assessment for the Phase IIA groundwater samples is presented in detail in RI/FS Phase IIA Technical Memorandum No. 5 (ABB-ES, 1995d).

4.1 ANALYTICAL PROGRAM. Samples collected during the Phase IIB of the RI at Site 17 were analyzed using field screening and off-site laboratory analytical methods. Sampling locations are presented in Chapter 3.0 of this report and investigative results are presented in Chapter 5.0.

Groundwater samples were collected and analyzed by an off-site laboratory using CLP methodology for analysis of VOCs, SVOCs, TRPH, pesticides, PCBs, metals, and cyanide. Some groundwater samples were also analyzed for wet chemistry analyses. The laboratory analytical program is described in more detail in Section 2.2 of the NAS Whiting Field GIR (HLA, 1998).

Analytical results obtained for all groundwater samples during the RI sampling events were submitted as NEESA Level D (USEPA Level IV) analytical packages for VOCs, SVOCs, pesticides, PCBs, metals, cyanide, and wet chemistry.

4.2 DATA REVIEW. Data validation is the technical review of individual analytical results relative to the following criteria:

- DQOs and QAPP in the NAS Whiting Field Work Plan, Volume 1 (E. C. Jordan, 1990) and GIR (HLA, 1998).
- NEESA guidance document 20.2-047B, Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program (NEESA, 1988).
- *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, 1994a).
- *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, 1994b).

The data validation process is described in Section 2.3 of the NAS Whiting Field GIR (HLA, 1998).

The data were reviewed, validated, and evaluated using the PARCC specified in the DQOs. PARCC criteria are described in Section 2.3 of the NAS Whiting Field GIR (HLA, 1998). The Site 17 Phase IIB groundwater analytical data were validated by Laboratory Data Consultants, Inc. (LDC), of Carlsbad, California, in 1996. The Site 17 Phase IIB data includes sample delivery groups (SDG) WF022 and WF023. The subsections below summarize the PARCC criteria evaluation of the analytical data.

4.2.1 Precision Precision is a measure of the agreement or repeatability of a set of replicate results (relative percent difference [RPD]) obtained from duplicate laboratory analyses of samples collected from the same location and depth interval. Precision for analytical data collected during the RI sampling events was evaluated using results of field duplicate samples, laboratory duplicate samples, matrix spike and matrix spike duplicate (MS/MSD) samples, and/or consecutive laboratory control samples. The evaluation of precision for the RI sampling event is presented in Table 4-1 and summarized below.

The RPD criteria were not met for one environmental sample (groundwater) and associated duplicates for one organic (acetone) and several inorganic analytes. None of the organic analytical results were qualified during the data validation process based on RPD criteria for the environmental and associated duplicate sample pairs.

The RPD criteria for one VOC (acetone) and three inorganic analytes (aluminum, iron, and manganese) were not met for one groundwater sample (01G00102) and associated duplicates in SDG WF022.

4.2.2 Accuracy Accuracy is a measure of the agreement between the true value and the value measured using an analytical method (percent recovery). Accuracy also is evaluated during data validation by assessing initial and continuing calibration data for the analytical instrument. Accuracy for analytical data collected during the RI sampling events was assessed by evaluating percent recoveries for MS/MSD samples, surrogate recoveries, laboratory control samples, and initial and continuing calibration standard results. The evaluation of recoveries for MS/MSD samples is presented in Table 4-2 and summarized below.

The percent recovery for some of the soil and groundwater samples was above or below the target range; therefore, some analytical results may be biased high or low. Some of the analytical results for SVOCs and inorganic analytes were qualified based on the evaluation of percent recovery.

A summary of the surrogate spike samples and the surrogate compounds that were outside control limits for the Phase IIB samples collected at Site 17 is presented in Table 4-3. The required control limits were also identified for each surrogate compound. All the samples associated with these surrogates were qualified in accordance with the USEPA functional guidelines as presented in Subsection 3.3.4 of the GIR (HLA, 1998).

Initial calibrations are performed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for compounds on the

Table 4-1
Precision Summary for Groundwater Field Duplicate Samples

Remedial Investigation Report Site 17, Crash Crew Training Area Naval Air Station Whiting Field Milton, Florida				
SDG Number: WF022 Sample ID: 01G00102	Sample Concentration	Duplicate Concentration	RPD	Control Limits
<u>Volatile Organic Compounds (µg/L)</u>				
Acetone	4	2	67	40
<u>Inorganic Analytes (µg/L)</u>				
Aluminum	19.1	10.3	50	25
Barium	15.6	15.6	0	25
Beryllium	0.53	ND	NC	25
Calcium	5,850	6,250	7	25
Copper	ND	1.4	NC	25
Iron	12.2	8.8	32	25
Lead	1.3	1.5	14	25
Magnesium	337	331	2	25
Manganese	6.7	9.0	29	25
Potassium	938	842	11	25
Sodium	2,100	2,070	1	25
Vanadium	ND	1.6	NC	25
Zinc	10.2	11.4	11	25
Cyanide	1.9	ND	NC	25
SDG Number: WF023 Sample ID: 01G00102	Sample Concentration	Duplicate Concentration	RPD	Control Limits
<u>Volatile Organic Compounds (µg/L)</u>				
Acetone	ND	ND	ND	10
Carbon disulfide	ND	ND	1	10
<u>Inorganic Analytes (µg/L)</u>				
Aluminum	79.3	84.6	6	25
Barium	128	129	0.8	25
Beryllium	0.39	ND	NC	25
Calcium	113,000	113,000	0	25
Iron	36.2	38.7	7	25
Lead	1.4	1.3	7	25
Magnesium	9,560	9,560	0.3	25
Manganese	13.5	13.7	1	25
Nickel	7.8	9.6	21	25
Potassium	4,610	4,580	0.7	25
Selenium	1.2	0.66	58	25
Sodium	2,200	2,240	2	25
See notes at end of table.				

Table 4-1 (Continued)
Precision Summary for Groundwater Field Duplicate Samples

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

SDG Number: WF023 Sample ID: 01G00102	Sample Concentration	Duplicate Concentration	RPD	Control Limits
Inorganic Analytes ($\mu\text{g/l}$) (Continued)				
Vanadium	3.0	2.8	7	25
Zinc	1.8	2.0	11	25
Cyanide	4.5	2.0	77	25

Notes: SDG = sample delivery group.
 ID = identification.
 RPD = relative percent difference.
 $\mu\text{g/l}$ = micrograms per liter.

ND = nondetect.
 NC = not calculable.
 D_1 = sample concentration.
 D_2 = duplicate concentration.

$$RPD = 100 \times \frac{|D_1 - D_2|}{0.5(D_1 + D_2)} \quad (1)$$

Table 4-2
Accuracy Summary for MS/MSD Samples

Remedial Investigation Report
 Site 17, Crash Crew Training Area
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 Milton, Florida

SDG Number	MS/MSD Sample	Analyte	% Recovery MS/MSD ¹	Control Limits
WF022	Groundwater BKG00101			
	<u>Semivolatile Organic Compounds</u>			
		4-Chloro-3-methylphenol	108/115	23 to 97
		4-Nitrophenol	88/93	10 to 80
		2,4-Dinitrotoluene	100/108	24 to 96
		Pentachlorophenol	106/118	9 to 103
WF023	Groundwater 02G00301			
	<u>Semivolatile Organic Compounds</u>			
		4-Nitrophenol	88/82	10 to 80
		2,4-Dinitrotoluene	97/NA	24 to 96
		Pentachlorophenol	139/122	9 to 103

¹ MSD analyses are generally not performed for inorganic analysis; therefore, only the percent recovery for the MS is reported.

Notes: MS/MSD = matrix spike and matrix spike duplicate.

SDG = sample delivery group.

% = percent.

NA = not analyzed.

Table 4-3
Accuracy Summary for Surrogate Recoveries Outside Quality Control Criteria

Remedial Investigation Report
 Site 17, Crash Crew Training Area
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SDG Number	Sample ID	Spiked Analyte	Surrogate Recovery (%R) ¹	QC Limits (percent)
WF022	17G00101	Decachlorobiphenyl	58/56	60 to 150
WF022	17G00201	Decachlorobiphenyl	52/21	60 to 150
WF023	01G00201	Decachlorobiphenyl	32/28	60 to 150
WF023	01G00301	Decachlorobiphenyl	49/47	60 to 150

¹ Reported as value for first column/second column.

Notes: SDG = sample delivery group.

ID = identification.

%R = percent recovery, the formula is %R = A-B/C×100, where A is the measured concentration of the spiked analyte, B is the measured concentration of the spike compound in the unspilled sample, and C is the true concentration of the spiked analyte.

QC = quality control.

TCL for VOCs. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. Continuing calibrations are performed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data.

Continuing calibration establishes the 12-hour relative response factor (RRF) on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. Initial and continuing calibrations for organic analysis are measured by the percent relative standard deviation (%RSD) for initial calibrations and the percent difference (%D) for continuing calibrations. For inorganic analysis, the initial calibration verification and continuing calibration verification are measured.

Table 4-4 summarizes the initial and continuing calibration details for the groundwater samples collected at Site 1.

The evaluation of the %RSD for the initial calibrations and the %D for the continuing calibrations indicates that the response factors for the system performance check compounds generally met the required criteria for VOCs, SVOCs, pesticides, and PCBs. Samples associated with those SDGs in which certain VOCs, SVOCs, pesticides, and PCBs exhibiting an RRF that does not meet the minimum requirements were qualified as J or UJ.

Table 4-4
Summary of Initial and Continuing Calibration
for Site 17 Samples

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

SDG	Compound	Initial Calibration	Continuing Calibration	Qualifier
WF022	4-Chloroaniline	--	31.6	J
	2,4-Dinitrophenol	--	27.6	J
	4,6-Dinitro-2-methylphenol	--	33.8	J
WF023	Acetone	30.2	33.2	J
	4-Nitroaniline	--	37.8	J
	Chrysene	--	27.8	J
	4,4'-DDT	23.6	-	J

Notes: Calibration values expressed as percent recovery (the formula is %R = A-B/C×100, where A is the measured concentration of the spiked analyte, B is the measured concentration of the spike compound in the unspilled sample, and C is the true concentration of the spiked analyte).

SDG = sample delivery group.

-- = not detected.

J = the analyte was positively identified and is reported as an approximate concentration.

DDT = dichlorodiphenyltrichloroethane.

4.2.3 Representativeness Representativeness is the degree to which the data obtained from an environmental sample accurately reflect the presence or absence of contamination at a site. Field QC samples (including source water blanks, equipment rinse blanks, and trip blanks) and laboratory QC samples (including method [organic analysis] and preparation blanks [inorganic analysis]) were used

to assess representativeness. Representativeness also is assessed by review of the adherence to extraction and analysis holding times. The evaluation of representativeness in field QC samples for the RI sampling event is presented in Table 4-5 and summarized below.

Trip Blanks. Acetone was detected in sample 01T00101 at a concentration of 9 micrograms per liter ($\mu\text{g/l}$). Environmental samples associated with the trip blanks with results greater than the instrument detection level (IDL) but less than 10 times the amount detected in the trip blank were appropriately annotated with either a J or UJ qualifier (LDC, 1996).

Rinsate Blanks. VOCs, if present, were not detected at concentrations exceeding their IDL in the rinsate blanks. One SVOC, bis(2-ethylhexyl)phthalate, was detected in one of the rinsate blank samples at a concentration of 2 $\mu\text{g/l}$. SVOCs, if present, were not detected in associated soil samples at concentrations exceeding their IDL.

Metals detected at concentrations exceeding the IDL and less than the contract-required detection limits are aluminum, calcium, cyanide, and zinc.

Field Blank. 2-Butanone and di-n-octylphthalate were detected in the field blank at concentrations of 2 J $\mu\text{g/l}$ and 15 $\mu\text{g/l}$, respectively. Environmental samples associated with the field blank with results greater than the IDL but less than 10 times the amount detected in the field blank were appropriately annotated with a UJ qualifier.

Laboratory Method and Preparation Blanks. Concentrations of methylene chloride, acetone, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate were detected in the laboratory method blanks associated with SDG WF023.

Environmental samples associated with method blanks that contained methylene chloride and acetone with results greater than IDL but less than 10 times the amount detected in the laboratory preparation blanks were annotated with UJ qualifier (LDC, 1996).

Aluminum, calcium, cobalt, copper, iron, magnesium, mercury, selenium, and sodium were detected in laboratory method blanks. Sample results greater than IDL but less than five times the amount detected in the laboratory preparation blanks were appropriately annotated with a J or UJ qualifier (LDC, 1996).

Sampling and analysis holding times for each analytical fraction were met in all samples.

Qualification of the environmental samples was required because of the detection of target analytes in laboratory and field blanks. Qualification of the RI data, based on blank contamination, was performed according to USEPA data validation guidelines (USEPA, 1994a and 1994b).

4.2.4 Comparability Comparability is the confidence with which one data set can be compared with another and the degree to which the environmental data from each sampling event are considered equivalent. Comparability of the analytical data was assured by using standard operating procedures for sample collection, by using standard chemical analytical methods, and by reporting the analytical results in

Table 4-5
Representativeness Summary for Site 17 Field Quality Control Samples

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Sample Identifier:	01F00101	01R00101	01T00101	01R01101	01T01201
Collect Date:	06-DEC-95	06-DEC-95	05-DEC-95	23-JUL-96	22-JUL-96
Laboratory Sample No.:	G8876013	G8876012	G8864001	RB887005	RB887001
<u>Volatile Organic Compounds (µg/l)</u>					
Acetone	--	--	9.0 J	--	--
2-Butanone	2.0 J	--	--	--	--
<u>Semivolatile Organic Compounds (µg/l)</u>					
Di-n-octylphthalate	15	--	NA	--	NA
bis(2-Ethylhexyl)phthalate	--	2.0	NA	--	NA
<u>Pesticides and PCBs (µg/l)</u>					
None detected					
<u>Inorganic Analytes (µg/l)</u>					
Aluminum	--	--	NA	13.3 J	NA
Calcium	--	178 J	NA	--	NA
Zinc	--	2.9 J	NA	--	NA
Cyanide	--	--	NA	2.6 J	NA

Notes: µg/l = micrograms per liter.

-- = analyte not detected.

J = estimated value.

NA = not analyzed.

PCB = polychlorinated biphenyl.

standard units (SUs). The sampling, shipment, and analytical protocols were consistent with USEPA standard operating procedures and methodologies described in work plans for NAS Whiting Field throughout the period of the RI.

4.2.5 Completeness Completeness is the percentage of useable data reported and validated compared with the total number of measurements made. Useable data are those measurements that were not rejected (qualified with an "R") during the validation process. None of the analytical data were rejected. The goal for analytical completeness for the RI sampling event was 85 percent useable data. The completeness goal of 85 percent was met for all matrices and all parameters.

4.3 SUMMARY. Based on the results of the QC sample analyses, the established precision and accuracy goals of the project were achieved (Table 4-6). Some field- and/or laboratory-derived contamination was present in some of the QC samples, which required the results from some of the environmental samples to be amended. QC sample results and data validation criteria indicate a 100 percent completeness was achieved, thus satisfying the 85 percent completeness goal. Standard methods of analysis and units of measure were used throughout the project, thus meeting the QC criteria and the DQOs presented in the workplan.

Table 4-6
Summary of DQO Assessment - PARCC Parameters

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

	Precision ¹	Accuracy ²	Representativeness	Completeness (%)	Comparability
Surface and Subsurface Soil Samples					
TCL VOC	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL metals and total cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable

¹ Cumulative of sampling and analytical components.

² Analytical component.

Notes: All the units are expressed as the ratio of number of analytes meeting the quality control criteria to the total number of analytes.

DQO = data quality objective.

PARCC = precision, accuracy, reproducibility, completeness, and comparability.

% = percent.

TCL = target compound list.

VOC = volatile organic compound.

SVOC = list semivolatile organic compound.

PCB = polychlorinated biphenyl.

TAL = target analyte list.

Overall, the data generated during the sampling event meet established DQOs and are acceptable for use in site characterization, risk assessment, and evaluation of corrective measures.

5.0 INVESTIGATIVE RESULTS

The following sections present the geologic and hydrologic analysis as well as analytical results of the soil gas, surface soil, and groundwater sampling events.

5.1 GEOLOGIC RESULTS. Surface soils (land surface to less than 1 foot) were generally described as brown to reddish-brown (fine- to very fine-grained) silty sand with trace clay or gravel. Shallow subsurface soil (2 to 7 feet bls) tended to be reddish-brown in color and contained interbedded sandy silt and clay layers.

Beneath the above-described surficial material, the lithology of Site 17 appeared to primarily consist of various shades of pinkish, orangish, and tannish (fine- to medium-grained) sands to a depth of at least 120 feet bls. One clay seam (2 to 6 feet thick) was encountered at approximately 40 to 50 feet bls at the location of three monitoring wells (WHF-17-1S, WHF-17-2 and WHF-17-3) drilled at the site. Other seams of clay and silt were thin (less than 1 inch in thickness) and infrequently encountered below 20 feet.

Detailed descriptions can be found in the boring and monitoring well logs presented in the RI/FS Technical Memorandum No. 2 (ABB-ES, 1995a) and in Appendix B of this report. A general discussion of the geology at NAS Whiting Field is presented in Subsection 1.4.5 of the GIR (HLA, 1998).

5.2 HYDROGEOLOGIC RESULTS. The hydrogeologic assessment included determining horizontal and vertical hydraulic gradients, hydraulic conductivities, and seepage velocities. The hydrogeologic assessment results are used to evaluate the transport of human health and ecological chemicals of potential concern from the site by groundwater flow. Contaminant fate and transport for human health and ecological chemicals of potential concern at Site 17 is presented in Chapter 8.0 of this report.

The hydrologic assessment of Site 17 draws on data from Sites 1, 2, and 18 which are also found in the northwest quadrant of NAS Whiting Field.

Groundwater Flow Direction. Table 5-1, summarizes the results of the water-level measurements recorded in the northwest quadrant during the RI field program. Groundwater flow patterns and potentiometric surface maps depicting the February 8 and 9, 1994, event (Figure 5-1) and the November 7 to 9, 1996, event (Figure 5-2) are included in the body of this report. Data from these measurement events indicate groundwater flows to the south-southwest. Facilitywide water table elevation data are provided in Appendix D of the GIR (HLA, 1998).

Horizontal and Vertical Gradients. Table 5-2 provides a summary of the horizontal hydraulic gradients calculated for Site 17 and the other RI/FS sites in the northwest quadrant. The horizontal hydraulic gradients in the area ranged from 0.0059 feet per foot (ft/ft) (monitoring wells WHF-18-2 and WHF-18-3) to 0.0016 ft/ft (monitoring wells WHF-17-1S and WHF-17-2). Average hydraulic gradients calculated for each measurement event ranged from 0.0034 ft/ft for October 1994 to 0.0053 ft/ft for November 1996. The overall average horizontal hydraulic gradient for all measurement events from 1993 through 1996 was 0.0039 ft/ft.

Table 5-1
Summary of Water-Level Elevations

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	September 30 and October 1, 1993		February 8 and 9, 1994		June 22 to 24, 1994			
			Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)		
Northwest Disposal and Crash Crew Training Areas										
Site 1, Northwest Disposal Area										
WHF-1-1	142.62	123	64.70	77.92	66.00	76.62	66.26	76.36		
WHF-1-1S	143.08	75	64.40	78.68	65.84	77.24	66.11	76.97		
WHF-1-2	145.61	78	66.13	79.48	67.53	78.08	67.99	77.62		
WHF-1-3	155.50	87	76.68	78.82	78.02	77.48	78.51	76.99		
WHF-1-4	151.86	79	--	--	--	--	--	--		
Site 2, Northwest Open Disposal Area										
WHF-2-1	150.80	87	77.96	72.84	79.18	71.62	79.00	71.80		
WHF-2-2	159.16	91	--	--	--	--	--	--		
WHF-2-3	160.63	91	--	--	--	--	--	--		
Site 17, Crash Crew Training Area										
WHF-17-1	194.71	159	111.10	83.61	112.39	82.32	113.56	81.15		
WHF-17-1S	194.96	115	111.29	83.67	112.60	82.36	113.78	81.18		
WHF-17-2	197.35	121	114.05	83.30	115.35	82.00	116.52	80.83		
WHF-17-3	201.21	126	117.52	83.69	117.12	84.09	117.53	83.68		
Site 18, Crash Crew Training Area										
WHF-18-1	163.57	120	93.29	70.28	94.53	69.04	94.61	68.96		
WHF-18-2	164.75	107	95.82	68.93	97.04	67.71	98.03	66.72		
WHF-18-3	175.64	112	104.30	71.34	105.59	70.05	105.90	69.74		
See notes at end of table.										

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	October 10 to 13, 1994		January 10 to 13, 1995		April 19 and 20, 1995			
			Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)		
Northwest Disposal and Crash Crew Training Areas										
Site 1, Northwest Disposal Area										
WHF-1-1	142.62	123	64.15	78.47	64.36	78.26	64.02	78.60		
WHF-1-1S	143.08	75	63.92	79.16	64.13	78.95	63.80	79.28		
WHF-1-2	145.61	78	65.72	79.89	65.91	79.70	65.57	80.04		
WHF-1-3	155.50	87	76.23	79.27	76.32	79.18	76.10	79.40		
WHF-1-4	151.86	79	--	--	--	--	--	--		
Site 2, Northwest Open Disposal Area										
WHF-2-1	150.80	87	76.94	73.86	77.45	73.35	76.96	73.84		
WHF-2-2	159.16	91	--	--	--	--	--	--		
WHF-2-3	160.63	91	--	--	--	--	--	--		
Site 17, Crash Crew Training Area										
WHF-17-1	194.71	159	111.49	83.22	110.94	83.77	110.97	83.74		
WHF-17-1S	194.96	115	111.72	83.24	111.15	83.81	111.17	83.79		
WHF-17-2	197.35	121	114.45	82.90	113.89	83.46	113.92	83.43		
WHF-17-3	201.21	126	123.65	77.56	114.87	83.34	114.88	86.33		
Site 18, Crash Crew Training Area										
WHF-18-1	163.57	120	92.28	71.29	92.50	71.07	92.35	71.22		
WHF-18-2	164.75	107	94.76	69.99	94.97	69.78	94.85	69.90		
WHF-18-3	175.64	112	103.55	72.09	103.48	72.16	103.46	72.18		
See notes at end of table.										

Table 5-1 (Continued)
Summary of Water-Level Elevations

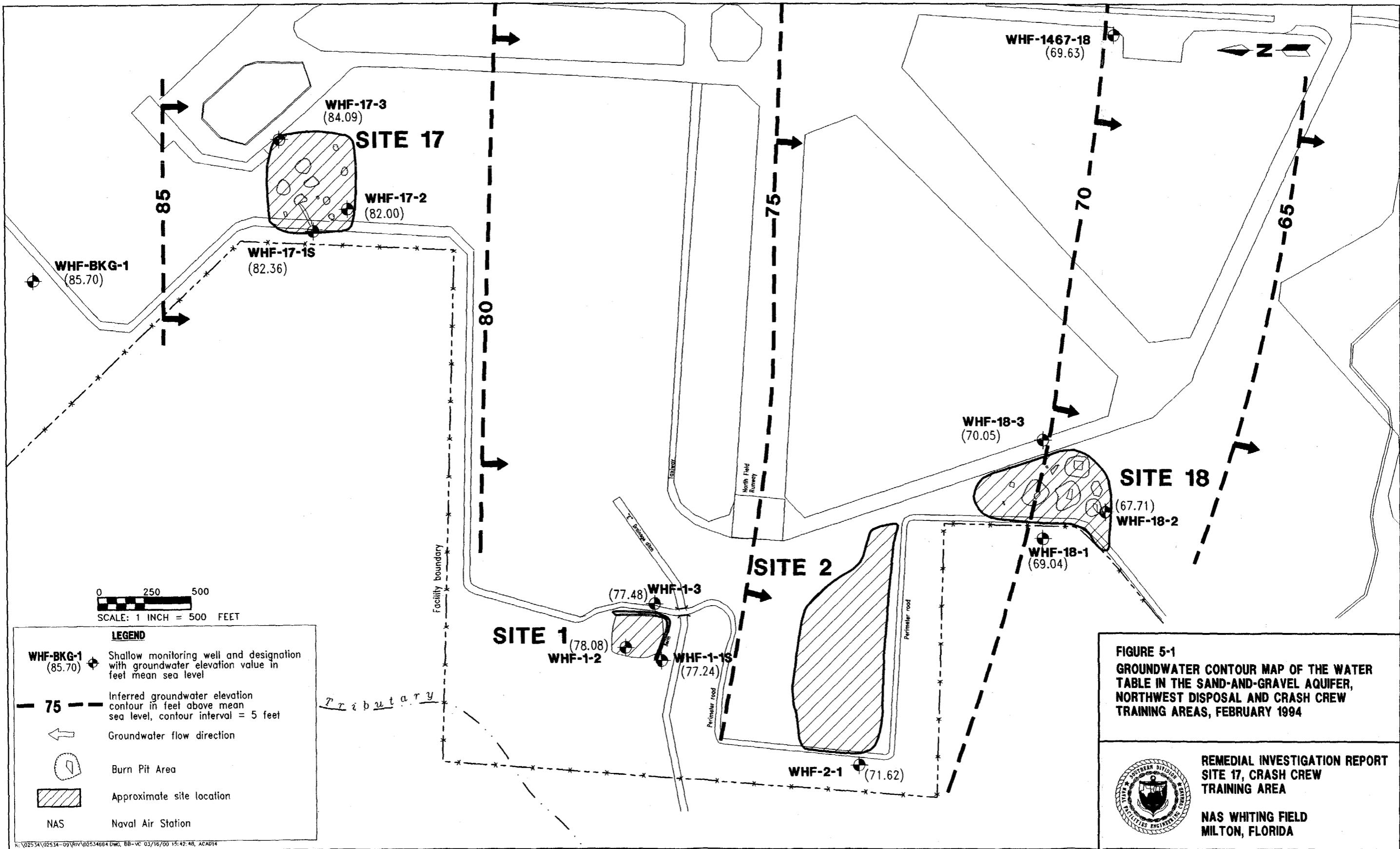
Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	July 28 and 29, 1995		October 12 to 14, 1995		January 19 and 20, 1996			
			Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)		
<u>Northwest Disposal and Crash Crew Training Areas</u>										
Site 1, Northwest Disposal Area										
W.H.F-1-1	142.62	123	62.42	80.20	61.84	80.78	58.18	84.44		
W.H.F-1-1S	143.08	75	62.12	80.96	61.58	81.50	57.81	85.27		
W.H.F-1-2	145.61	78	63.86	81.75	63.27	82.34	59.59	86.02		
W.H.F-1-3	155.50	87	74.33	81.17	74.03	81.47	70.08	85.42		
W.H.F-1-4	151.86	79	--	--	--	--	--	--		
Site 2, Northwest Open Disposal Area										
W.H.F-2-1	150.80	87	75.56	75.24	75.21	75.59	71.50	79.30		
W.H.F-2-2	159.16	91	--	--	--	--	--	--		
W.H.F-2-3	160.63	91	--	--	--	--	--	--		
Site 17, Crash Crew Training Area										
W.H.F-17-1	194.71	159	109.17	85.54	108.85	85.86	104.88	89.83		
W.H.F-17-1S	194.96	115	109.39	85.57	109.05	85.91	105.09	89.87		
W.H.F-17-2	197.35	121	112.13	85.22	111.80	85.55	107.87	89.48		
W.H.F-17-3	201.21	126	113.12	88.09	112.73	88.49	109.82	91.34		
Site 18, Crash Crew Training Area										
W.H.F-18-1	163.57	120	90.76	72.81	91.09	72.48	86.81	76.76		
W.H.F-18-2	164.75	107	93.28	71.47	93.69	71.06	89.37	75.38		
W.H.F-18-3	175.64	112	101.93	73.71	102.13	73.51	97.58	78.06		
See notes at end of table.										

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	April 25 to 27, 1996		July 25 to 27, 1996		November 7 to 9, 1996			
			Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Groundwater (ft BTOC)	Groundwater Elevation (ft msl)		
<u>Northwest Disposal and Crash Crew Training Areas</u>										
Site 1, Northwest Disposal Area										
WHF-1-1	142.62	123	57.58	85.04	57.43	85.19	58.92	83.70		
WHF-1-1S	143.08	75	57.13	85.95	57.09	85.99	59.53	83.55		
WHF-1-2	145.61	78	58.78	86.83	58.76	86.85	60.18	85.43		
WHF-1-3	155.50	87	69.40	86.10	69.23	86.27	70.63	84.87		
WHF-1-4	151.86	79	66.27	85.59	66.17	85.69	67.62	84.24		
Site 2, Northwest Open Disposal Area										
WHF-2-1	150.80	87	71.21	79.59	71.47	79.33	72.95	77.85		
WHF-2-2	159.16	91	79.96	79.20	80.08	79.08	81.58	77.58		
WHF-2-3	160.63	91	80.40	80.23	80.38	80.25	81.89	78.74		
Site 17, Crash Crew Training Area										
WHF-17-1	194.71	159	103.44	91.27	102.82	91.89	103.96	90.75		
WHF-17-1S	194.96	115	103.66	91.30	103.83	91.13	104.16	90.80		
WHF-17-2	197.35	121	106.40	90.95	105.73	91.62	106.91	90.44		
WHF-17-3	201.21	126	107.26	93.95	106.81	94.4	107.68	93.53		
Site 18, Crash Crew Training Area										
WHF-18-1	163.57	120	86.69	76.88	86.62	76.95	88.05	75.52		
WHF-18-2	164.75	107	89.37	75.38	89.32	75.43	90.73	74.02		
WHF-18-3	175.64	112	97.57	78.07	97.51	78.13	98.70	76.94		
Notes: TOC = top-of-casing. msl = mean sea level. ft BTOC = feet below top of casing.			ft msl = feet above mean sea level. -- = not measured.							



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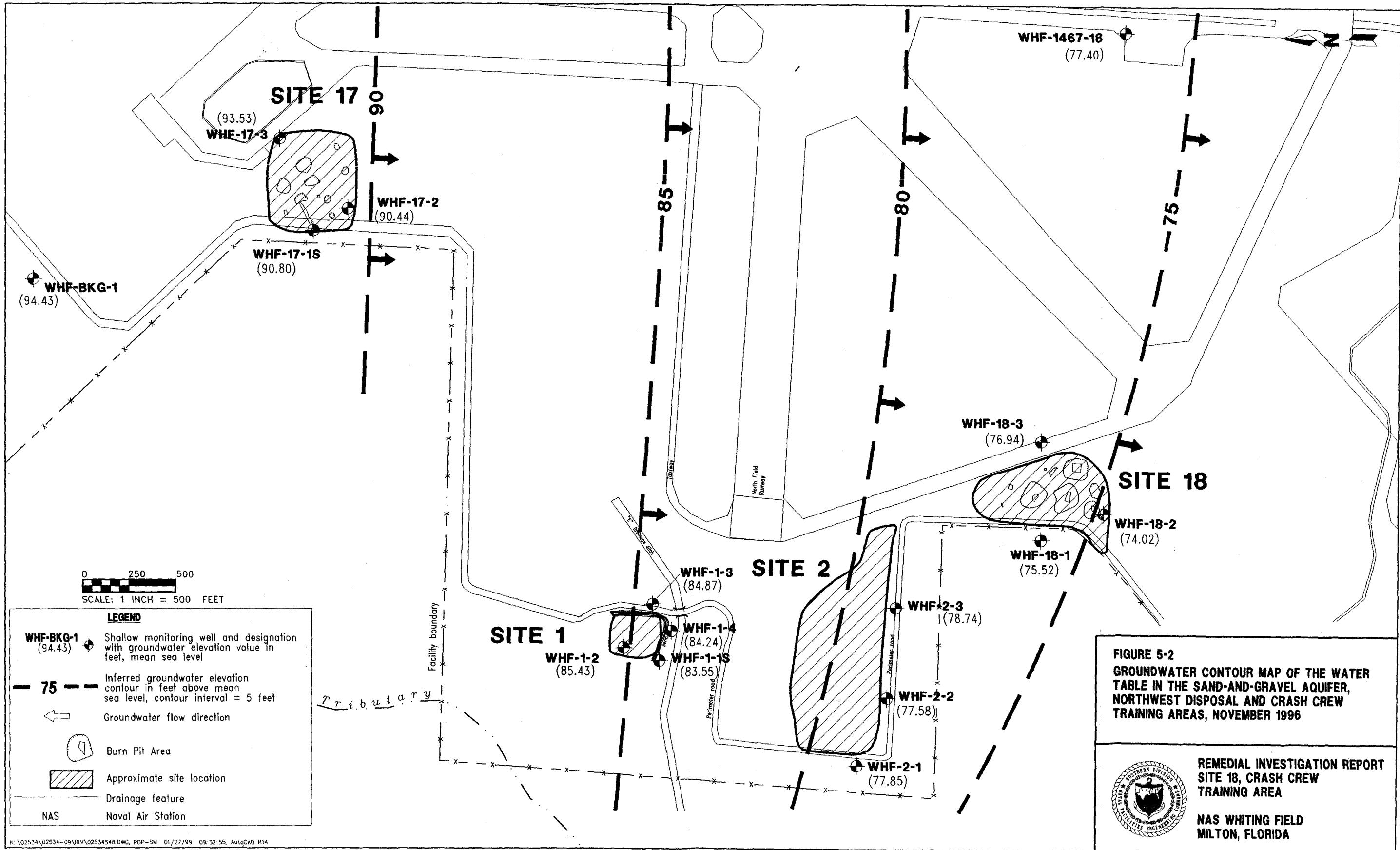


Table 5-2
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	September 30 to October 1, 1993		February 8 and 9, 1994		June 22 to 24, 1994		October 10 to 13, 1994	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
<u>Northwest Disposal and Crash Crew Training Areas</u>									
WHF-17-1S	218	83.67	0.0017	82.36	0.0017	81.18	0.0016	83.24	0.0016
WHF-17-2		83.30		82.00		80.83		82.90	
WHF-18-3	511	71.34	0.0047	70.05	0.0046	69.74	0.0059	72.09	0.0041
WHF-18-2		68.93		67.71		66.72		69.99	
WHF-1-2	205	79.48	0.0039	78.08	0.0041	77.62	0.0032	79.89	0.0036
WHF-1-1S		78.68		77.24		76.97		79.16	
WHF-1-1S	1,201	78.68	0.0049	77.24	0.0047	76.97	0.0043	79.16	0.0044
WHF-2-1		72.84		71.62		71.80		73.86	
Average gradient		0.0038		0.0038		0.0038		0.0034	
See notes at end of table.									

Table 5-2 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Well Designation	Distance Between Wells (feet)	January 10 to 13, 1995		April 19 and 20, 1995		July 28 and 29, 1995		October 12 to 14, 1995	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
<u>Northwest Disposal and Crash Crew Training Areas</u>									
WHF-17-1S	218	83.81	0.0016	83.79	0.0017	85.57	0.0016	85.91	0.0017
WHF-17-2		83.46		83.43		85.22		85.55	
WHF-18-3	511	72.16	0.0047	72.18	0.0045	73.71	0.0044	73.51	0.0048
WHF-18-2		69.78		69.90		71.47		71.06	
WHF-1-2	205	79.70	0.0037	80.04	0.0037	81.75	0.0039	82.34	0.0041
WHF-1-1S		78.95		79.28		80.96		81.50	
WHF-1-1S	1,201	78.95	0.0047	79.28	0.0045	80.96	0.0048	81.50	0.0049
WHF-2-1		73.35		73.84		75.24		75.59	
Average gradient		0.0037		0.0036		0.0037		0.0039	
See notes at end of table.									

Table 5-2 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Well Designation	Distance Between Wells (feet)	January 19 and 20, 1996		April 25 to 27, 1996		July 25 to 27, 1996		November 7 to 9, 1996	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
<u>Northwest Disposal and Crash Crew Training Areas</u>									
WHF-17-1S	218	89.87	0.0018	91.30	0.0016	91.13	0.0022	90.80	0.0017
WHF-17-2		89.48		90.95		91.62		90.44	
WHF-18-3	511	78.06	0.0052	78.07	0.0053	78.13	0.0053	76.94	0.0057
WHF-18-2		75.38		75.38		75.43		74.02	
WHF-1-2	205	86.02	0.0037	86.83	0.0043	86.85	0.0042	85.43	0.0092
WHF-1-1S		85.27		85.95		85.99		83.55	
WHF-1-1S	1,201	85.27	0.0050	85.95	0.0053	85.99	0.0055	83.55	0.0047
WHF-2-1		79.30		79.59		79.33		77.85	
Average gradient		0.0039		0.0041		0.0043		0.0053	

Notes: msl = mean sea level.
 ft/ft = feet per foot.

The vertical hydraulic gradients were calculated using well pairs at Site 1 (monitoring wells WHF-1-1S and WHF-1-1) and Site 17 (monitoring wells WHF-17-1S and WHF-17-1). Gradient measurements for the well pair at Site 1 were also examined because Sites 1, 2, 17, and 18 are all considered to be part of the same hydrogeologic area. Table 5-3 presents a summary of the vertical hydraulic gradients calculated for the northwest quadrant RI/FS sites. Values calculated for the paired monitoring wells ranged from 0.005 ft/ft to 0.0189 ft/ft. The vertical hydraulic gradient was downward at most well locations; however, an upward gradient was observed at Site 17 during the July 25 to 27, 1996, survey and at Site 1 during the November 7 to 9, 1996, survey.

Hydraulic Conductivity and Seepage Velocity. Four slug tests were conducted in the Northwest Disposal and Crash Crew Training Areas during the RI. Table 5-4 summarizes the hydraulic conductivity values calculated for monitoring wells in the northwest quadrant sites. Three trials of rising head slug tests were conducted in four monitoring wells in the northwest quadrant area.

Hydraulic conductivity data from monitoring well WHF-18-2 were rejected because they exceeded the 20 percent variance criteria in the data validation procedure. The validation of hydraulic conductivity data is presented in Section 2.3 in Table 2-2 of Technical Memorandum No. 4, Hydrogeologic Assessment, January 1995 (ABB-ES, 1995c).

Average hydraulic conductivity values for individual monitoring wells ranged from 4.01 feet per day (ft/day) (1.42×10^{-3} centimeters per second [cm/sec]) for WHF-17-2 to 19.47 ft/day (6.87×10^{-3} cm/sec) for WHF-1-1S. The screen interval lithology (fine- to medium-grained sand) around monitoring wells WHF-1-1S and WHF-2-1 was almost five times more conductive than the lithology (poorly graded medium-grained sand) around WHF-17-2S. The geometric mean of the hydraulic conductivity data from Sites 1, 2, and 17 was 11.43 ft/day (4.03×10^{-3} cm/sec).

Seepage Velocity. Table 5-5 summarizes the seepage velocities (average linear pore water velocity) for the water table zone of the sand-and-gravel aquifer for sites in the northwest quadrant sites. The calculations used an assumed effective porosity (n) of 0.35 for the site. The value represents silty through poorly graded sands (Fetter, 1988). Seepage velocities for individual sites ranged from 0.02 ft/day at Site 17 to 0.26 ft/day at Sites 1 and 2. The average of the seepage velocity values for the northwest quadrant sites was 0.17 ft/day (62 feet per year).

5.3 SURFACE SOIL ANALYTICAL RESULTS. Figure 5-3 and Tables 5-6 and 5-7 summarize the analytical results for organic and inorganic analytes, respectively, detected in 34 surface soil samples and 2 duplicates collected at Site 17. Tables 5-8 and 5-9 summarize the frequency of detection, range of detection limits, range of detection concentrations, comparison to background screening values, USEPA Region III risk-based concentrations (RBCs) for residential and industrial screening criteria (USEPA, 1998), and Chapter 67-770, FAC, residential and industrial SCTLs (FDEP, 1999). The complete analytical results for soil samples collected at Site 17 are presented in Appendix C; the sample locations are shown on Figure 3-1.

Table 5-3
Summary of Vertical Hydraulic Gradients

**Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida**

Table 5-3 Summary of Vertical Hydraulic Gradients								
Remedial Investigation Report Site 17, Crash Crew Training Area Naval Air Station Whiting Field Milton, Florida								
Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Screens (feet)	September 30 and October 1, 1993			February 8 and 9, 1994		
			Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction
<u>Northwest Disposal and Crash Crew Training Areas</u>								
WHF-1-1S	67.68	48.06	78.68	0.0158	Downward	77.24	0.0129	Downward
WHF-1-1	19.62		77.92			76.62		
WHF-17-1S	79.46	43.75	83.67	0.0013	Downward	82.36	0.0009	Downward
WHF-17-1	35.71		83.61			82.32		

Table 5-3 (Continued)
Summary of Vertical Hydraulic Gradients

**Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida**

Table 5-3 (Continued) Summary of Vertical Hydraulic Gradients									
Remedial Investigation Report Site 17, Crash Crew Training Area Naval Air Station Whiting Field Milton, Florida									
Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Screens (feet)	June 22 to 24, 1994			October 10 to 13, 1994			Vertical Flow Direction
			Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction	
Northwest Disposal and Crash Crew Training Areas									
WHF-1-1S	67.68	48.06	76.97	0.0127	Downward	79.16	0.0144	Downward	
WHF-1-1	19.62		76.36			78.47			
WHF-17-1S	79.46	43.75	81.18	0.0007	Downward	83.24	0.0005	Downward	
WHF-17-1	35.71		81.15			83.22			

Table 5-3 (Continued)
Summary of Vertical Hydraulic Gradients

**Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida**

Table 5-3 (Continued)
Summary of Vertical Hydraulic Gradients

**Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida**

Table 5-3 (Continued)
Summary of Vertical Hydraulic Gradients

**Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida**

Table 5-3 (Continued)
Summary of Vertical Hydraulic Gradients

**Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida**

Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Screens (feet)	July 25 to 27, 1996			November 7 to 9, 1996		
			Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction
<u>Northwest Disposal and Crash Crew Training Areas</u>								
WHF-1-1S	67.68	48.06	85.99	0.0166	Downward	83.55	-0.0031	Upward
WHF-1-1	19.62		85.19			83.70		
WHF-17-1S	79.46	43.75	91.13	-0.0174	Upward	90.80	0.0011	Downward
WHF-17-1	35.71		91.89			90.75		

Table 5-4
Summary of Hydraulic Conductivity (K) Data from Slug Tests

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Well Number	Range of K (ft/day)	Number of Usable Runs	Average K (ft/min)	Average K (ft/day)	Average K (cm/sec)		
<u>Shallow/Intermediate Monitoring Wells</u>							
Site 1, Northwest Disposal Area							
WHF-1-1S	18.09 to 20.33	3	0.0135	19.47	6.87×10^{-3}		
Site 2, Northwest Open Disposal Area							
WHF-2-1	16.79 to 20.35	3	0.0133	19.14	6.75×10^{-3}		
Site 17, Crash Crew Training Area							
WHF-17-2	3.67 to 4.50	2	0.0028	4.01	1.42×10^{-3}		
Site 18, Crash Crew Training Area							
WHF-18-2	R	R	R	R	R		
				Geometric Mean	11.43		
				4.03×10^{-3}			
Notes: Average is the arithmetic average.							
ft/day = feet per day.			cm/sec = centimeters per second.				
ft/min = feet per minute.			R = data rejected.				

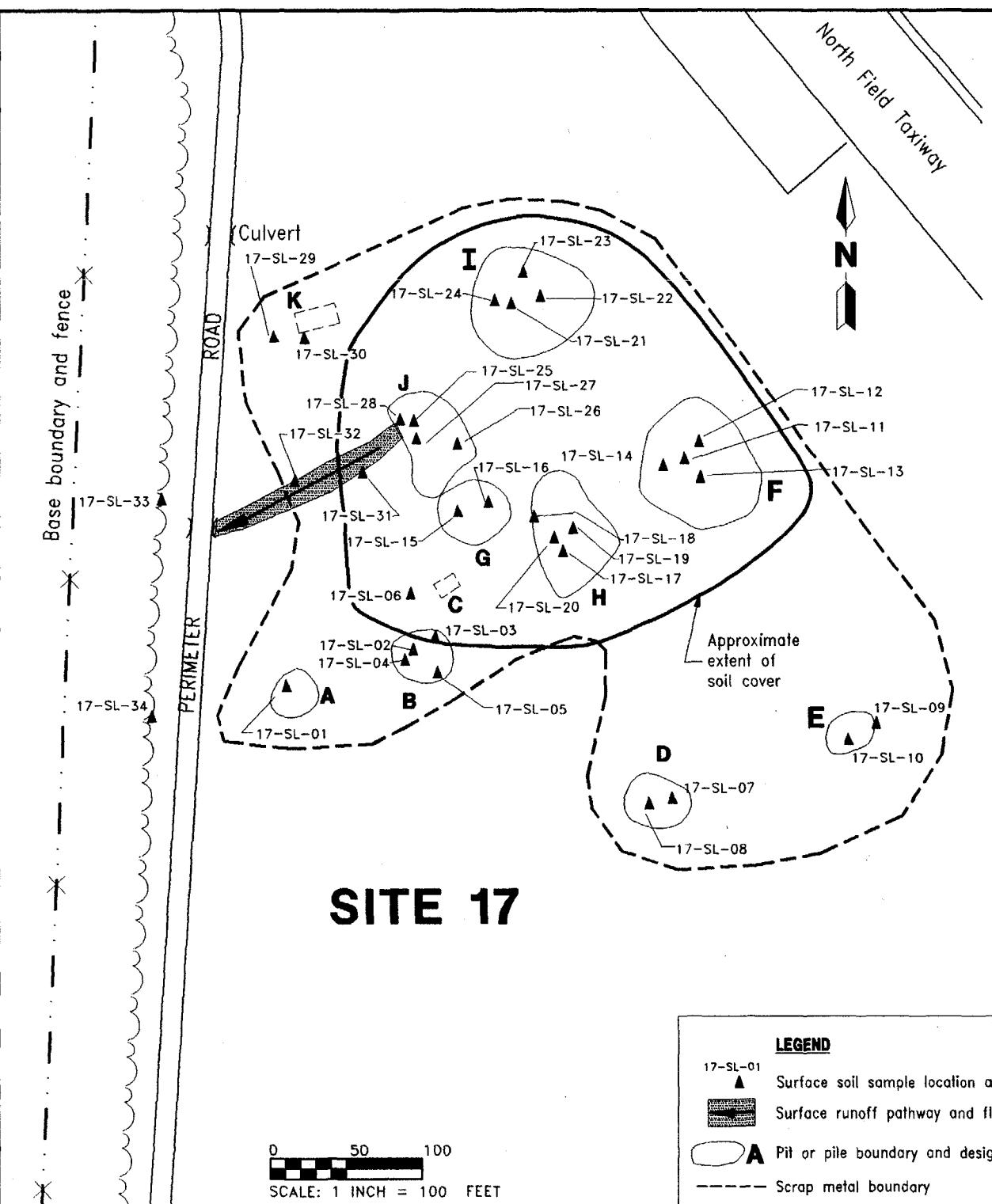
Table 5-5
Summary of Seepage Velocities

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Investigation Area	Sites	Monitoring Well Pair	Horizontal Gradient (ft/ft) ¹	K (ft/day) ²	Effective Porosity	Seepage Velocity (ft/day)
Northwest Disposal and Crash Crew Training Areas	1	WHF-1-1S and WHF-1-2	0.0043	19.47	0.35	0.24
	1 and 2	WHF-1-1S and WHF-2-1	0.0048	19.14	0.35	0.26
	17	WHF-17-1S and WHF-17-2	0.0017	4.01	0.35	0.02
	18	WHF-18-2 and WHF-18-3	0.0049	11.43	0.35	0.16
Arithmetic Average						0.17

¹ Horizontal gradients are the average value for all groundwater measurements performed between September 30, 1993, and November 9, 1996.
² K is averaged where values are available for both wells in the well pair.
³ K was not determined at Site 18. The value 11.43 is the average K for Sites 1, 2, and 17.

Notes: ft/ft = feet per foot.
K = hydraulic conductivity.
ft/day = feet per day.



	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Ethylbenzene	Iron	Methylene chloride	Naphthalene	Toluene	TRPH	Trichloroethene	Vanadium	Xylenes
17-SL-01		1.3													17-SL-01
17-SL-02												616	0.16		17-SL-02
17-SL-06												19,300			17-SL-06
17-SL-07		4.6													17-SL-07
17-SL-08		1.6													17-SL-08
17-SL-09		0.81													17-SL-09
17-SL-10		3.1													17-SL-10
17-SL-11							12					7,840			17-SL-11
17-SL-12		0.84										11,700			17-SL-12
17-SL-13		1.2										9,720			17-SL-13
17-SL-14		1.1										6,790	0.57		17-SL-14
17-SL-15		3.4											25		17-SL-15
17-SL-16		1.0	145	13.9	64.7				0.13			410			17-SL-16
17-SL-17		2.8										768		17.5	0.34
17-SL-18		1.8											15.2		17-SL-18
17-SL-19		5.9					14					23	7,510	37.8	130
17-SL-20		2.2											949	30.8	17-SL-20
17-SL-21		5.1	3.1	30.6	64.1	235							8,550	30.9	17-SL-21
17-SL-22			3.7										1,040	31.7	17-SL-22
17-SL-23			2.1				218						5,540	20.1	17-SL-23
17-SL-24			3.8										2,340	30.9	17-SL-24
17-SL-25			2.5											27.4	17-SL-25
17-SL-26			2.6											19.3	17-SL-26
17-SL-27			2.3										2,820		17-SL-27
17-SL-28			2.4										5,940	20.4	17-SL-28
17-SL-29			1.8				82.1	139		0.69				19.6	17-SL-29
17-SL-30			3.1											33	17-SL-30
17-SL-31		10.3													17-SL-31
17-SL-32			2.0												17-SL-32
17-SL-33			5.0										563	39.4	17-SL-33
17-SL-34			1.8											24.8	17-SL-34

NOTES:
 1. Only detections above FDEP cleanup target levels are shown.
 2. All concentrations are in milligrams per kilogram.

**FIGURE 5-3
SURFACE SOIL ANALYTICAL RESULTS**



**REMEDIAL INVESTIGATION REPORT
SITE 17, CRASH CREW
TRAINING AREA**

**NAS WHITING FIELD
MILTON, FLORIDA**

00778J032

Table 5-6
Summary of Surface Soil Organic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	17-SL-01	17-SL-02	17-SL-03	17-SL-04	17-SL-05	17-SL-06	17-SL-07	17-SL-08
Collect Date	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92
<u>Volatile Organic Compounds (µg/kg)</u>								
2-Butanone	--	--	--	--	--	--	--	--
Carbon disulfide	2 J	--	--	1 J	--	11	1 J	1 J
Ethylbenzene	--	--	--	--	--	3 J	--	--
Methylene chloride	--	--	--	--	--	--	--	--
Toluene	--	--	--	--	--	2 J	--	--
Trichloroethene	--	160 J	--	--	--	--	--	2 J
Xylenes (total)	5 J	--	--	--	--	11	--	4 J
<u>Semivolatile Organic Compounds (µg/kg)</u>								
2-Methylnaphthalene	--	--	--	--	--	190 J	--	--
Butylbenzylphthalate	360 J	--	490	--	--	--	--	--
Naphthalene	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	49 J	--	--	--	--	--	--	--
<u>Pesticides and PCBs (µg/kg)</u>								
None detected	--	--	--	--	--	--	--	--
<u>Other (mg/kg)</u>								
Total recoverable petroleum hydrocarbons	--	616	81.6	19	--	19,300	--	2.5
See notes at end of table.								

Table 5-6 (Continued)
Summary of Surface Soil Organic Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	17-SL-09	17-SL-10	17-SL-11	17-SL-11A	17-SL-12	17-SL-13	17-SL-13_R	17-SL-14
Collect Date	08/15/92	08/15/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92
Volatile Organic Compounds (µg/kg)								
2-Butanone	--	--	--	--	55	--	--	80 J
Carbon disulfide	1 J	--	--	--	2 J	--	--	26 J
Ethylbenzene	--	--	5,000	12,000	2 J	--	--	--
Methylene chloride	--	--	--	--	--	--	--	--
Toluene	--	--	--	--	--	--	--	38 J
Trichloroethene	--	--	--	--	--	--	--	--
Xylenes (total)	4 J	3 J	30,000 E	84,000	38	--	--	570 J
Semivolatile Organic Compounds (µg/kg)								
2-Methylnaphthalene	--	--	1,400	3,100	--	--	--	--
Butylbenzylphthalate	--	--	--	--	--	--	--	--
Naphthalene	--	--	1,100 J	1,700	--	--	--	7,200
bis(2-Ethylhexyl)phthalate	--	--	430 J	400 J	--	210 J	--	--
Pesticides and PCBs (µg/kg)								
None detected	--	--	--	--	--	--	--	--
Other (mg/kg)								
Total recoverable petroleum hydrocarbons	2.3	4.2	7,690	7,840	11,700	9,720	--	6,790
See notes at end of table.								

Table 5-6 (Continued)
Summary of Surface Soil Organic Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	17-SL-14_R	17-SL-15	17-SL-16	17-SL-16_R	17-SL-17	17-SL-17A	17-SL-18	17-SL-19
Collect Date	08/16/92	08/15/92	08/15/92	08/15/92	08/16/92	08/16/92	08/15/92	08/15/92
<u>Volatile Organic Compounds (µg/kg)</u>								
2-Butanone	52 J	--	--	--	--	--	--	--
Carbon disulfide	9 J	--	5 J	7 J	--	--	--	--
Ethylbenzene	--	--	--	--	--	--	--	14,000 J
Methylene chloride	--	--	130 J	57 J	--	--	--	--
Toluene	31 J	--	--	--	--	--	--	23,000 J
Trichloroethene	--	--	--	--	--	--	--	--
Xylenes (total)	500 J	--	3 J	5 J	340 J	--	--	130,000 J
<u>Semivolatile Organic Compounds (µg/kg)</u>								
2-Methylnaphthalene	--	--	--	--	--	--	--	4,100
Butylbenzylphthalate	--	--	--	--	--	--	--	--
Naphthalene	--	--	--	--	--	--	--	1,500 J
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	--	--	750 J
<u>Pesticides and PCBs (µg/kg)</u>								
None detected	--	--	--	--	--	--	--	--
<u>Other (mg/kg)</u>								
Total recoverable petroleum hydrocarbons	--	3.2	410	--	768	647	33.3	7,510
See notes at end of table.								

Table 5-6 (Continued)
Summary of Surface Soil Organic Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	17-SL-19_R	17-SL-20	17-SL-21	17-SL-21A	17-SL-22	17-SL-23	17-SL-24	17-SL-25	17-SL-26
Collect Date	08/15/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)									
2-Butanone	--	--	--	--	--	--	--	--	--
Carbon disulfide	--	--	--	--	--	--	--	1 J	--
Ethylbenzene	6,900 J	6 J	1,100	510 J	--	--	--	--	--
Methylene chloride	--	--	--	--	--	--	--	--	--
Toluene	11,000 J	--	--	--	--	--	--	--	--
Trichloroethene	--	--	--	--	--	--	--	--	--
Xylenes (total)	70,000 J	19 J	9,600	3,700	--	27	--	--	--
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)									
2-Methylnaphthalene	--		1,500 J	1,400 J	--	4,900	--	--	--
Butylbenzylphthalate	--		--	--	--	--	--	--	--
Naphthalene	--	81 J	620 J	520 J	--	1,000 J	--	--	--
bis(2-Ethylhexyl)phthalate	--	160 J	450 J	--	--	--	--	--	--
Pesticides and PCBs ($\mu\text{g}/\text{kg}$)									
None detected	--	--	--	--	--	--	--	--	--
Other (mg/kg)									
Total recoverable petroleum hydrocarbons	--	949	8,180	8,550	1,040	5,540	2,340	160	208
See notes at end of table.									

Table 5-6 (Continued)
Summary of Surface Soil Organic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	17-SL-27	17-SL-28	17-SL-29	17-SL-29_R	17-SL-30	17-SL-31	17-SL-32	17-SL-33	17-SL-34
Collect Date	08/16/92	08/16/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)									
2-Butanone	6 J	--	--	--	--	--	--	--	--
Carbon disulfide	--	--	2 J	4 J	--	--	2 J	2 J	3 J
Ethylbenzene	--	--	--	--	--	--	--	--	--
Methylene chloride	--	--	69 J	--	--	--	--	--	--
Toluene	--	--	1 J	--	--	--	--	--	--
Trichloroethene	--	--	--	--	--	--	--	--	--
Xylenes (total)	--	--	2 J	2 J	1 J	3 J	5 J	5 J	2 J
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)									
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	--	--	420	--	--	--	--	--	--
Naphthalene	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	75 J	--	--	--	--	--	--
Pesticides and PCBs $\mu\text{g}/\text{kg}$									
None detected	--	--	--	--	--	--	--	--	--
Other (mg/kg)									
Total recoverable petroleum hydrocarbons	2,820	5,940	14.4	--	5.6	208	--	563	13.2
Notes: $\mu\text{g}/\text{kg}$ = micrograms per kilogram. -- = concentration of analyte, if present, was less than detection limit. J = estimated value. PCB = polychlorinated biphenyl.					mg/kg = milligram per kilogram. A = duplicate sample. R = reanalyzed sample. E = exceeds linear calibration range.				

Table 5-7
Summary of Surface Soil Inorganic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	17-SL-01	17-SL-02	17-SL-03	17-SL-04	17-SL-05	17-SL-06	17-SL-07	17-SL-08
Collect Date	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92
Inorganic Analytes (mg/kg)								
Aluminum	9,610	5,950	5,970	6,310	4,500	7,560	29,700	6,380
Antimony	3.3 J	--	--	--	--	--	--	--
Arsenic	1.3 J	0.72	0.53 J	0.7 J	0.29 J	0.55 J	4.6	1.6 J
Barium	11.8 J	9.1 J	11 J	9 J	8.5 J	11.1 J	6.8 J	3.6 J
Beryllium	0.09 J	0.07 J	0.06 J	--	--	--	0.16 J	--
Cadmium	1.8	1.6	1.7	--	0.76 J	6.8	--	--
Calcium	279 J	106 J	94.9 J	125 J	129 J	208 J	97.5 J	111 J
Chromium	17.4	9.8	15.1	6.2	4.1	19.2	26.9	6.4
Cobalt	2.4 J	2 J	2 J	1.8 J	1.5 J	1.8 J	2 J	1.1 J
Copper	6.4 J	9.8	8.9	7.1	5.1 J	44.2	9.8	6.1 J
Iron	4,920	3,970	3,120	3,370	2,730	3,430	23,800	4,550
Lead	6.3	54.8	18.2	11.8	7.7	70.1	6.8	4
Magnesium	178 J	114 J	124 J	125 J	93.3 J	172 J	106 J	59.1 J
Manganese	198	34.4	17.1	28.2	19.6	31.8	13.9	5.1
Nickel	4 J	5.2 J	2.8 J	3.8 J	3.2 J	5.7 J	4.7 J	3.2 J
Potassium	--	252 J	157 J	198 J	--	288 J	--	--
Silver	--	--	--	--	--	--	--	--
Sodium	204 J	245 J	217 J	157 J	209 J	186 J	279 J	172 J
Vanadium	13.7	7.9 J	8 J	8.7 J	6.4 J	9.5 J	71.3	12.8
Zinc	13.4 J	22.2	21.6	13 J	7.3	69.1	11	8.7 J

See notes at end of table.

Table 5-7 (Continued)
Summary of Surface Soil Inorganic Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	17-SL-09	17-SL-10	17-SL-11	17-SL-11A	17-SL-12	17-SL-13	17-SL-13_R	17-SL-14
Collect Date	08/15/92	08/15/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92
Inorganic Analytes (mg/kg)								
Aluminum	5,420	29,900	7,190	7,390	5,410	7,340	--	5,750
Antimony	--	--	--	--	--	--	--	--
Arsenic	0.81 J	3.1	--	--	0.84 J	1.2 J	--	1.1 J
Barium	8.3 J	12 J	24 J	10.6 J	26.9 J	20.7 J	--	11.8 J
Beryllium	--	0.07 J	--	0.1 J	--	--	--	--
Cadmium	1.2	--	--	--	--	1.1 J	--	--
Calcium	97 J	199 J	--	--	136 J	415 J	--	107 J
Chromium	4	24.7	12 J	16.1 J	6	12.9	--	5.4
Cobalt	1.3 J	0.85 J	--	--	--	1 J	--	--
Copper	2.4 J	6.4 J	24.3 J	44.9 J	9.2	15.9	--	22.3
Iron	3,020	12,300	10,100	21,000	2,870	4,640	--	2,550
Lead	3	4.3	156	136	36.1	95.4	--	15.7
Magnesium	106 J	143 J	180 J	205 J	80.8 J	148 J	--	105 J
Manganese	32.4	18	56.1 J	117 J	11	50.4	--	10
Nickel	3.1 J	4.6 J	8.5 J	14.7	--	--	--	--
Potassium	--	--	264 J	277 J	185 J	384 J	--	197 J
Silver	--	--	--	--	--	0.47 J	--	0.44 J
Sodium	186 J	184 J	--	--	157 J	167 J	--	199 J
Vanadium	7.6 J	37	9.2 J	9.3 J	8.4 J	10 J	--	8.4 J
Zinc	7.2 J	8.9 J	74.1 J	96.2 J	18.8	56.4	--	20.7

See notes at end of table.

Table 5-7 (Continued)
Summary of Surface Soil Inorganic Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	17-SL-14_R	17-SL-15	17-SL-16	17-SL-16_R	17-SL-17	17-SL-17A	17-SL-18	17-SL-19
Collect Date	08/16/92	08/15/92	08/15/92	08/15/92	08/16/92	08/16/92	08/15/92	08/15/92
<u>Inorganic Analytes (mg/kg)</u>								
Aluminum	--	16,500	8,400	--	12,000	12,700	11,700	27,900
Antimony	--	--	--	--	--	--	--	--
Arsenic	--	3.4	1 J	--	1.6 J	2.8	1.8 J	5.9
Barium	--	17 J	145	--	9.6 J	12.2 J	17 J	22.6 J
Beryllium	--	0.16 J	0.08 J	--	0.08 J	--	0.12 J	0.22 J
Cadmium	--	0.87 J	13.9	--	--	--	--	--
Calcium	--	150 J	357 J	--	197 J	229 J	123 J	262 J
Chromium	--	16.5	64.7	--	10.1	12.1	8.9	21.6
Cobalt	--	1.3 J	0.98 J	--	0.86 J	1.1 J	1.1 J	1.4 J
Copper	--	7.3	128	--	10.3	19.4	10	18.1
Iron	--	10,100	4,270	--	5,900	6,040	5,780	13,500
Lead	--	9	207	--	56.9	66.6	9.7	64.7
Magnesium	--	183 J	358 J	--	121 J	162 J	175 J	238 J
Manganese	--	26.1	63.7	--	18.3	22.4	20	30
Nickel	--	--	--	--	--	2.7 J	5.2 J	3.5 J
Potassium	--	248 J	248 J	--	397 J	403 J	196 J	875 J
Silver	--	--	--	--	--	0.61 J	--	--
Sodium	--	209 J	198 J	--	257 J	183 J	178 J	193 J
Vanadium	--	25	10.3 J	--	16.1	17.5	15.2	37.8
Zinc	--	10.2	179	--	13.8	23.4	11.1	21.9

See notes at end of table.

Table 5-7 (Continued)
Summary of Surface Soil Inorganic Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	17-SL-19_R	17-SL-20	17-SL-21	17-SL-21A	17-SL-22	17-SL-23	17-SL-24	17-SL-25	17-SL-26
Collect Date	08/15/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92	08/16/92
Inorganic Analytes (mg/kg)									
Aluminum	--	23,800	21,400	24,800	19,200	17,200	20,900	17,500	12,700
Antimony	--		5.1 J	3.1 J	--	--	--	--	--
Arsenic	--	2.2 J	2.8	3.1	3.7	2.1 J	3.8	2.5	2.6
Barium	--	49.5	91.2	168	37.9 J	34.8 J	46.7 J	24.2 J	14.8 J
Beryllium	--	0.09 J	0.21 J	0.2 J	0.15 J	0.06 J	0.16 J	0.08 J	0.07 J
Cadmium	--	8.4	22.4 J	30.6 J	--	--	2.8	--	--
Calcium	--	253 J	--	--	270 J	333 J	518 J	339 J	780 J
Chromium	--	40	58.1 J	64.1 J	18.5	18.7	30.3	16.9	13.2
Cobalt	--	1.5 J	--	--	1.8 J	1.8 J	2.1 J	1.7 J	1.1 J
Copper	--	124	75.6 J	235 J	18.2	218	14.1	19.8	24.5
Iron	--	11,500	11,900	11,300	11,700	7,520	11,200	9,690	7,030
Lead	--	79.9	80.8	117	31.7	87.2	48.4	29.2	26.5
Magnesium	--	267 J	484 J	520 J	256 J	378 J	461 J	187 J	159 J
Manganese	--	42.5	93.3	117 J	94.4	144	95.4	59.3	60.7
Nickel	--	3.2 J	8.8 J	8.8 J	3.1 J	--	4.9 J	2.8 J	3.3 J
Potassium	--	460 J	805 J	816 J	1,090 J	1,350	641 J	544 J	564 J
Silver	--	0.5 J	--	0.53 J	--	--	--	0.53 J	--
Sodium	--	157 J	--	--	162 J	181 J	167 J	163 J	193 J
Vanadium	--	30.8 J	30.7	30.9	31.7	20.1	30.9	27.4	19.3
Zinc	--	73	131 J	158 J	25.1	35.5	52.8	23.3	41.9

See notes at end of table.

Table 5-7 (Continued) Summary of Surface Soil Inorganic Analytical Results									
Analyte	Remedial Investigation Report Site 17, Crash Crew Training Area Naval Air Station Whiting Field Milton, Florida								
	17-SL-27	17-SL-28	17-SL-29	17-SL-29_R	17-SL-30	17-SL-31	17-SL-32	17-SL-33	17-SL-34
Collect Date	08/16/92	08/16/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92	08/15/92
Inorganic Analytes (mg/kg)									
Aluminum	9,570	14,200	14,500	--	20,000	7,130	8,510	26,200	17,700
Antimony	--	--	--	--	--	10.3 J	--	--	--
Arsenic	2.3 J	2.4 J	1.8 J	--	3.1	1.1 J	2 J	5	1.8 J
Barium	95.2	53.2	27.9 J	--	8.3 J	26.3 J	19.9 J	14.8 J	14.5 J
Beryllium	0.12 J	0.07 J	0.17 J	--	0.16 J	0.08 J	--	0.21 J	0.19 J
Cadmium	1.8		7.4	--	--	1.8	--	--	--
Calcium	196 J	210 J	532 J	--	151 J	280 J	340 J	439 J	411 J
Chromium	15.8	16.3	82.1	--	15	15.7	12.6	17.9	12.4
Cobalt	0.72 J	1.1 J	1.8 J	--	1.3 J	0.67 J	0.59 J	1.3 J	1.5 J
Copper	22.9	27.1	139	--	5.1 J	14.5	8.7	11.9	7
Iron	4,880	7,710	6,980	--	10,900	3,900	4,930	13,900	9,180
Lead	79.6	35.9	19.9	--	8.6	98	25.9	59.6	8.7
Magnesium	128 J	167 J	302 J	--	97.4 J	95.1 J	123 J	194 J	140 J
Manganese	21.5	38.9	194	--	27.3	17.9	35.7	80.1	187
Nickel	--		4 J	--	--	--	--	4.6 J	2.9 J
Potassium	331 J	616 J	153 J	--	184 J	--	155 J	--	--
Silver	--	--	--	--	--	--	--	--	--
Sodium	271 J	277 J	179 J	--	186 J	206 J	133 J	136 J	151 J
Vanadium	13.8	20.4	19.6	--	33	10.8 J	14.1	39.4	24.8
Zinc	48.3	49.8	54.6	--	11.1	43	20.5	19.7	10.1

Notes: mg/kg = milligram per kilogram.

-- = concentration of analyte, if present, was less than detection limit.

J = estimated value.

A = duplicate sample.

R = reanalyzed sample.

Table 5-8
Summary of Surface Soil Organic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection ¹	Range of Detected Concentrations ²	Detection Limits	Background Screening Values ³	USEPA Region III RBCs Residential/Industrial ⁴	SCTLs for Florida Residential/Industrial Leachability ⁵
Volatile Organic Compounds (µg/kg)						
2-Butanone	3/34	6 to 80	11 to 8,250	NA	⁶ 4,700,000/120,000,000	3,100,000/21,000,000/17,000
Carbon disulfide	14/34	1 to 26	5 to 4,015	NA	⁶ 20,000,000/780,000	200,000/1,400,000/5,600
Ethylbenzene	6/34	2 to 14,000	5 to 4,015	NA	⁶ 20,000,000/780,000	1,100,000/8,400,000/600
Methylene chloride	2/34	57 to 130	6 to 4,600	NA	⁷ 85,000/760,000	16,000/23,000/20
Toluene	4/34	1 to 23,000	5 to 4,015	NA	⁶ 1,600,000/41,000,000	380,000/2,600,000/500
Trichloroethene	2/34	2 to 160	5 to 4,015	NA	⁷ 58,000/520,000	6,000/8,500/30
Xylenes (total)	20/34	1 to 130,000	5 to 4,015	NA	⁶ 16,000,000/410,000,000	5,900,000/40,000,000/200
Semivolatile Organic Compounds (µg/kg)						
2-Methylnaphthalene	5/34	190 to 4,900	360 to 9,900	NA	⁶ 160,000/4,100,000	80,000/560,000/6,100
Butylbenzylphthalate	3/34	360 to 490	360 to 9,900	NA	⁶ 1,600,000/4,100,000	15,000,000/320,000/310,000
Naphthalene	6/34	81 to 7,200	360 to 9,900	NA	⁶ 160,000/4,100,000	40,000/270,000/1,700
bis(2-Ethylhexyl)phthalate	7/34	49 to 750	360 to 9,900	80.3	⁷ 46,000/410,000	76,000/280,000/3,600,000
Other (mg/kg)						
Total recoverable petroleum hydrocarbons	30/34	2.3 to 19,300	1.8 to 2	NA	--	340/2,500/340
See notes at end of table.						

Table 5-8 (Continued)
Summary of Surface Soil Organic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
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- ¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
- ² If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
- ³ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
- ⁴ Source: USEPA Region III RBC table (October 1, 1998).
- ⁵ Source: Chapter 62-777, Florida Administrative Code (FDEP, 1999).
- ⁶ Values correspond to a noncancer hazard quotient of 0.1.
- ⁷ Values correspond to a human cancer risk level of 1 in 1,000,000.

Notes: The average of a sample and its duplicate is used for all table calculations.

Bold indicates analyte exceeded screening criteria.

Background samples: BKG-SL-02, BK-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and, BKS00501.
Background duplicate sample: BKS00201D.

USEPA = U.S. Environmental Protection Agency.

RBC = risk-based concentration.

SCTL = soil cleanup target level.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

NA = not applicable.

mg/kg = milligrams per kilogram.

-- = number is greater than 1×10^6 or unlisted.

Table 5-9
Summary of Surface Soil Inorganic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection ¹	Range of Detected Concentrations	Detection Limits ²	Background Screening Values ³	USEPA Region III RBCs Residential/Industrial ⁴	SCTLs for Florida Residential/Industrial/Leachability ⁵
Inorganic Analytes (mg/kg)						
Aluminum	34/34	4,500 to 29,900	40 to 40	19,580	7,800/200,000 ⁶	72,000/-/-SPLP
Antimony	3/34	3.3 to 10.3	2.7 to 12	8	3.1/82 ⁶	26/240/5
Arsenic	33/34	0.29 to 5.9	1.55 to 2	3.6	0.43/3.8 ⁷	0.8/3.7/29
Barium	34/34	3.6 to 145	40 to 40	30	550/14,000 ⁶	110/87,000/1,600
Beryllium	25/34	0.055* to 0.22	0.05 to 1	0.38	16/410 ⁶	120/800/63
Cadmium	15/34	0.76 to 26.5*	0.59 to 1	0.58	3.9/100 ⁶	75/1,300/8
Calcium	32/34	94.9 to 780	343.5 to 1,000	1,108	--/--	--/--/--
Chromium	34/34	4 to 82.1	2 to 2	14	23/610 ^{6,8}	210/420/38
Cobalt	30/34	0.59 to 2.4	0.37 to 10	3.4	470/12,000 ⁶	4,700/110,000/SPLP
Copper	34/34	2.4 to 218	5 to 5	9.6	310/8,200 ⁶	110/76,000/SPLP
Iron	34/34	2,550 to 23,800	2 to 20	11,172	2,300/61,000 ⁶	23,000/480,000/SPLP
Lead	34/34	3 to 207	1 to 1	11.8	400 ⁶	400/920/SPLP
Magnesium	34/34	59.1 to 502*	1,000 to 1,000	548	--/--	--/--/--
Manganese	34/34	5.1 to 198	3 to 3	632	160/4,100 ⁶	1,600/22,000/SPLP
Nickel	22/34	2* to 11.6*	2.3 to 8	7.2	160/4,100 ⁶	110/28,000/130
Potassium	25/34	153 to 1,350	131 to 1,000	250	--/--	--/--/--
Silver	4/34	0.355* to 0.53	0.32 to 2	0.78	39/1,000 ⁶	390/10,000/5
Sodium	32/34	133 to 279	198 to 1,000	376	--/--	--/--/--
Vanadium	34/34	6.4 to 71.3	10 to 10	28	55/1,400 ⁶	15/7,400/980
Zinc	34/34	7.2 to 179	4 to 4	17	2,300/61,000 ⁶	23,000/560,000/6,000

See notes at end of table.

Table 5-9 (Continued)
Summary of Surface Soil Inorganic Analytical Results

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- ¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
- ² If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
- ³ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples for Troupe and Orangeburg soil types.
- ⁴ Source: USEPA Region III RBC table (October 1, 1998).
- ⁵ Source: Chapter 62-777, Florida Administrative Code (FDEP, 1999).
- ⁶ The calculated values correspond to a noncancer hazard quotient of 0.1.
- ⁷ The values correspond to a human cancer risk level of 1 in 1,000,000.
- ⁸ Hexavalent chromium.
- ⁹ USEPA Office of Solid Waste and Emergency Response Directive No. 9355.4-12, Revised Interim Recommended Soil Cleanup for CERCLA and RCRA Sites.

Notes: Background samples: BKG-SL-02, BK-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and, BKS00501.

Background duplicate sample: BKS00201D.

Bold indicates analyte exceeded screening criteria.

USEPA = U.S. Environmental Protection Agency.

RBC = risk-based concentration.

SCTL = soil cleanup target level.

mg/kg = milligrams per kilogram.

* = average of sample and duplicate.

-- = number is greater than 1×10^6 or unlisted.

Background screening criteria were established by collecting background samples across the installation from each USDA soil type in which RI sites are located at NAS Whiting Field. These data are presented in Subsection 3.3.1 of the GIR (HLA, 1998). The arithmetic mean of each analyte detected in the background soil samples for soil types associated with Site 17 was calculated by summing individual analyte concentrations and then dividing the sum by the number of samples in which the analytes were detected. Site 17 environmental samples are then compared to twice the arithmetic mean of analyte concentrations detected in background surface soil samples associated with the Troup loamy sand and Orangeburg sandy loam. In June 1999, the State of Florida promulgated SCTLs for Chapter 62-777, FAC. Because groundwater contamination is indicated at the site, the Chapter 62-777, FAC, SCTLs for residential and industrial direct exposures and leachability are applicable for Site 17 at NAS Whiting Field. Leachability values are only compared to those compounds that exceeded the Chapter 62-777, FAC, groundwater cleanup target levels (GCTLs) in site groundwater samples. Site 17 surface soil analytical results are compared to Chapter 62-777, FAC, SCTLs in Tables 5-6 and 5-8.

Organic analytes detected in surface soil samples consist of seven VOCs, four SVOCs, and TRPH. Five VOCs (ethylbenzene, methylene chloride, toluene, trichloroethene, and total xylenes) and one SVOC (naphthalene) exceeded Chapter 62-777, FAC, leachability SCTLs. All of the VOC and SVOCs detected were below the State and Federal residential and industrial target levels. TRPH exceeded the Chapter 62-777, FAC residential, industrial, and leachability SCTLs. No pesticides or PCBs were detected in the surface soil samples collected from Site 17.

Twenty TAL inorganic analytes were detected in the surface soil samples (Table 5-7). Ten analytes (aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, manganese and vanadium) exceeded either USEPA Region III residential soil screening values or Chapter 62-777, FAC, residential and leachability SCTLs (Table 5-9).

Arsenic was detected at concentrations that exceeded both USEPA Region III RBCs and Chapter 62-777, FAC, SCTLs for residential and industrial sites.

Iron exceeded the Federal residential screening criterion (2,300 milligrams per kilogram [mg/kg] based on a nonhazardous risk multiplier of 0.1) in all 34 surface soil samples.

5.4 SUBSURFACE SOIL ANALYTICAL RESULTS. Nineteen subsurface soil samples and two duplicate samples were collected from depths ranging from 5 to 60 feet bsl. Tables 5-10 and 5-11 present concentrations of organic and inorganic analytes, respectively, detected in all Site 17 subsurface soil samples. Figure 5-4 summarizes the subsurface soil exceedances of soil cleanup target levels. Tables 5-12 and 5-13 summarize the frequency of detection, range of detection limits, range of detection concentrations, comparison to background screening values, USEPA Region III RBCs for industrial screening criteria (USEPA, 1998a), and Chapter 62-777, FAC, industrial and leachability SCTLs.

Organic analytes detected in subsurface soil samples consist of three VOCs, two SVOCs, and two pesticides or PCBs. No VOCs, SVOCs, pesticides, or PCBs exceeded Florida or Federal residential or industrial screening criteria.

Table 5-10
Summary of Subsurface Soil Organic Analytical Results

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Analyte	17SB1-15-17	17SB1-15-17RE	17SB1-5-7	17SB1-5-7RE	17SB1-60-62	17SB2-10-12	17SB2-5-7	17SB3-10-12
Collect Date	01/19/93	01/19/93	01/19/93	01/19/93	01/07/93	01/19/93	01/19/93	01/07/93
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
2-Butanone	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	--	--	--	--	--	--	--	--
Acetone	--	29 J	--	11 J	--	18	47	--
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
Di-n-butylphthalate	--	--	--	--	--	--	--	--
Diethylphthalate	--	--	--	--	--	--	--	--
Pesticides and PCBs ($\mu\text{g}/\text{kg}$)								
4,4'-DDE	--	--	--	--	--	--	--	--
4,4'-DDT	--	--	--	--	--	--	--	--
Other (mg/kg)								
Total Recoverable Petroleum Hydrocarbons (TRPH)	--	--	66.2	--	--	2.5	5.5	--
See notes at end of table.								

Table 5-10 (Continued)
Summary of Subsurface Soil Organic Analytical Results

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Analyte	17SB4-10-12	17SB4-5-7	17SB5-10-12	17SB5-20-22	17SB5-20-22RE	17SB5-5-7	17SB5-5-7D (Duplicate)	17SB6-10-12
Collect Date	01/07/93	01/07/93	01/19/93	01/19/93	01/19/93	01/19/93	01/19/93	01/07/93
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
2-Butanone	--	--	--	--	--	18 J	23 J	--
4-Methyl-2-pentanone	--	--	--	--	--	--	--	--
Acetone	--	--	19	--	--	--	--	--
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
Di-n-butylphthalate	--	--	--	--	--	--	--	--
Diethylphthalate	94 J	--	--	--	--	--	--	--
Pesticides and PCBs ($\mu\text{g}/\text{kg}$)								
4,4'-DDE	--	--	--	--	--	--	--	--
4,4'-DDT	--	--	--	--	--	--	--	--
Other mg/kg								
TRPH	--	--	--	--	--	--	--	--

See notes at end of table.

Table 5-10 (Continued)
Summary of Subsurface Soil Organic Analytical Results

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 Site 17, Crash Crew Training Area
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Analyte	17SB6-5-7	17SB7-15-17	17SB7-5-7	17SB8-10-12	17SB8-5-7	17SB8-5-7RE	17SB9-10-12	17SB9-5-7
Collect Date	01/07/93	01/18/93	01/18/93	01/18/93	01/18/93	01/18/93	01/06/93	01/06/93
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
2-Butanone	34	--	--	--	--	--	--	--
4-Methyl-2-pentanone	4 J	--	--	--	--	--	--	--
Acetone	--	14 J	26 J	11 J	82 J	--	130 J	--
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
Di-n-butylphthalate	--	--	--	310 BJ	--	--	--	--
Diethylphthalate	--	--	--	--	--	--	--	--
Pesticides and PCBs ($\mu\text{g}/\text{kg}$)								
4,4'-DDE	6.5 J	--	--	--	--	--	--	--
4,4'-DDT	19	--	--	--	--	--	--	--
Other (mg/kg)								
TRPH	--	--	--	--	--	--	3.1	--

Notes: RE = sample was reanalyzed.
 $\mu\text{g}/\text{kg}$ = micrograms per kilogram.
 -- = concentration of analyte, if present, was less than detection limit.
 B = analyte detected in blank sample.
 J = estimated value.
 PCB = polychlorinated biphenyl.
 DDE = dichlorodiphenyldichloroethene.
 DDT = dichlorodiphenyltrichloroethane.
 mg/kg = milligram per kilogram.

Table 5-11 Summary of Subsurface Soil Inorganic Analytical Results								
Analyte	17SB1-15-17	17SB1-15-17RE	17SB1-5-7	17SB1-5-7RE	17SB1-60-62	17SB2-10-12	17SB2-5-7	17SB3-10-12
Collect Date	01/19/93	01/19/93	01/19/93	01/19/93	01/07/93	01/19/93	01/19/93	01/07/93
Inorganic Analytes (mg/kg)								
Aluminum	24,600	--	33,200	--	347	26,000	55,200	5,800
Antimony	--	--	--	--	--	--	--	--
Arsenic	5.5	--	8	--	--	6.2	2.2 J	2.1 J
Barium	5.8 J	--	14.3 J	--	0.51 J	4.1 J	10 J	2.4 J
Beryllium	0.15 J	--	0.28 J	--	--	0.21 J	0.45 J	--
Cadmium	--	--	--	--	--	--	--	--
Calcium	41.3 J	--	87.9 J	--	70.3 J	21.8 J	85.9 J	79.7 J
Chromium	15.9	--	27.9	--	2.1 J	18.8	45.4	9.3
Cobalt	--	--	0.83 J	--	--	--	0.57 J	--
Copper	4.3 J	--	6.7	--	1.2 J	5 J	9.9	2.6 J
Cyanide	0.52 J	--	0.51 J	--	--	0.52 J	0.51 J	--
Iron	13,200	--	22,300	--	457	17,800	39,100	10,400
Lead	3.4	--	44.7	--	0.3 J	5.2	7.8	2.9
Magnesium	96.4 J	--	177 J	--	14.3 J	79.9 J	186 J	33.6 J
Manganese	15.1	--	40.6	--	2.4 J	20.1	32.4	12.4
Mercury	--	--	--	--	0.04 J	--	0.03 J	--
Nickel	2.8 J	--	4.1 J	--	--	--	4.2 J	--
Potassium	--	--	1,180	--	--	--	--	96.9 J
Selenium	1.5	--	4	--	--	4.5	2.3	--
Silver	--	--	0.71 J	--	--	0.69 J	1.3 J	--
Sodium	--	--	19.9 J	--	169 J	23.5 J	49.7 J	184 J
Vanadium	36.4	--	57.6	--	1.6 J	47.3	100	27.7
Zinc	3.3 J	--	6.8	--	3.8 J	3.2 J	5.8	4.3 J

See notes at end of table.

Table 5-11 (Continued)
Summary of Subsurface Soil Inorganic Analytical Results

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 Site 17, Crash Crew Training Area
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Analyte	17SB4-10-12	17SB4-5-7	17SB5-10-12	17SB5-20-22	17SB5-20-22RE	17SB5-5-7	17SB5-5-7D (Duplicate)	17SB6-10-12
Collect Date	01/07/93	01/07/93	01/19/93	01/19/93	01/19/93	01/19/93	01/19/93	01/07/93
Inorganic Analytes (mg/kg)								
Aluminum	4,550	10,000	7,650	1,180	--	3,940 J	21,100 J	3,730
Antimony	--	--	--	--	--	--	--	--
Arsenic	1.3 J	0.5 J	2.2 J	0.43 J	--	2.1 J	3.3	0.68 J
Barium	2.5 J	4.8 J	3.8 J	0.32 J	--	5.3 J	8.3 J	1.5 J
Beryllium	--	--	0.13 J	--	--	--	--	--
Cadmium	--	0.75 J	--	--	--	--	--	--
Calcium	80.8 J	156 J	159 J	7.6 J	--	--	--	64.9 J
Chromium	10.3	26.3	10.6	1.2 J	--	23.7 J	35.1 J	4.8
Cobalt	--	--	--	--	--	--	1 J	--
Copper	3.2 J	6.3	7.8	--	--	4.3 J	7.9 J	3.7 J
Cyanide	--	--	0.51 J	0.46 J	--	--	--	--
Iron	11,900	29,300	12,400	742	--	25,500	43,400	6,240
Lead	2.8	2.6	3.5	0.18 J	--	4.4 J	6.8 J	0.92
Magnesium	37.6 J	84.8 J	111 J	--	--	--	--	18.3 J
Manganese	13.1	27.9	42.6	1.5 J	--	15.6	30	78.2
Mercury	0.03 J	--	--	--	--	0.03 J	0.02 J	--
Nickel	--	--	--	--	--	--	--	--
Potassium	--	53.6 J	--	--	--	222 J	345 J	--
Selenium	--	--	1.1 J	--	--	0.59 J	0.87 J	--
Silver	--	--	0.78 J	--	--	0.86 J	1.9 J	--
Sodium	204 J	207 J	--	--	--	30.2 J	--	168 J
Vanadium	31.2	74	37.8	1.6 J	--	68 J	91.8 J	15.7
Zinc	4.8	8.9	1.9 J	0.52 J	--	--	5.3 J	2.9 J

See notes at end of table.

Table 5-11 (Continued)
Summary of Subsurface Soil Inorganic Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

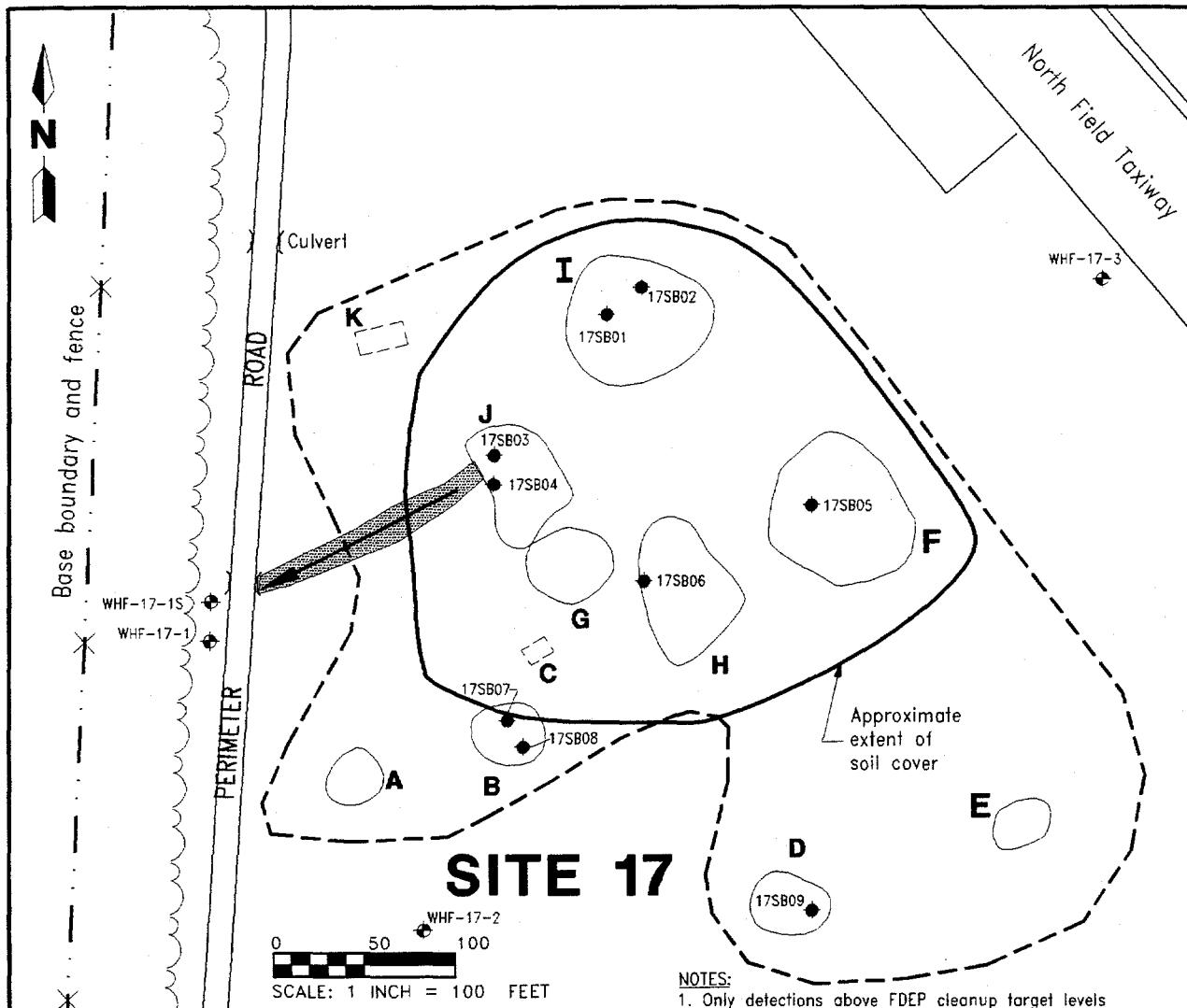
Analyte	17SB6-5-7	17SB7-15-17	17SB7-5-7	17SB8-10-12	17SB8-5-7	17SB8-5-7RE	17SB9-10-12	17SB9-5-7
Collect Date	01/07/93	01/18/93	01/18/93	01/18/93	01/18/93	01/18/93	01/06/93	01/06/93
Inorganic Analytes (mg/kg)								
Aluminum	9,250	1,540	45,000	19,000	53,300	--	6,220	7,800
Antimony	--	--	8 J	--	--	--	--	7 J
Arsenic	0.71 J	1.1 J	2.4 J	3.1 J	6.4	--	1.8 J	3
Barium	3.9 J	--	7.2 J	3.8 J	10.5 J	--	3.6 J	3 J
Beryllium	--	--	--	--	--	--	--	--
Cadmium	2.5	--	--	--	--	--	--	--
Calcium	147 J	14.2 J	16.9 J	--	--	--	--	--
Chromium	50.5	2.3	45.8	12.8	46.1	--	19.9	24.3
Cobalt	1.6 J	--	4.2 J	0.64 J	4.4 J	--	0.92 J	2.1 J
Copper	22.7	1.1 J	1.4 J	2.3 J	5.4 J	--	--	--
Cyanide	--	0.43 J	0.66 J	0.46 J	0.45 J	--	0.48 J	0.53 J
Iron	89,800	1,330	50,700	10,500	48,400	--	22,200	31,600
Lead	8.3	0.8 J	6.9	2.7	8.5	--	5.4	8
Magnesium	45.5 J	9.4 J	115 J	64.7 J	187 J	--	27.1 J	30.7 J
Manganese	226	7	76.9	28.7	41.5	--	15	24.4
Mercury	0.04 J	--	--	--	--	--	0.03 J	0.02 J
Nickel	3.1 J	--	3.1 J	3.9 J	6.9 J	--	--	--
Potassium	437 J	--	319 J	--	736 J	--	--	--
Selenium	--	0.91 J	0.64 J	0.61 J	3.4	--	--	0.65 J
Silver	1.3 J	--	1 J	--	1.4 J	--	0.81 J	1.2 J
Sodium	185 J	--	--	--	16.4 J	--	--	--
Vanadium	105	3.1 J	99.3	27.8	95.7	--	60.5	82
Zinc	18.9	0.81 J	1.6 J	1.7 J	3.3 J	--	--	--

Notes: RE = sample was reanalyzed.

-- = concentration of analyte, if present, was less than detection limit.

mg/kg = milligram per kilogram.

J = estimated value.



	Antimony (5-7)	Arsenic (5-7)	Arsenic (10-12)	Arsenic (15-17)	Chromium (5-7)	Iron (5-7)	Vanadium (5-7)	Vanadium (10-12)	Vanadium (15-17)
17SB01	8			5.5			57.6		36.4
17SB02	2.2	6.2			45.4	39,100	100	47.3	
17SB03		2.1						27.7	
17SB04		1.3				29,300	74	31.2	
17SB05	3.3	2.2				43,400	91.8	37.8	
17SB06					50.5	89,800	18.9	15.7	
17SB07	8	2.4	1.1		45.8	48,400	99.3		
17SB08		6.4	3.1		46.1	48,400	95.7	27.8	
17SB09	7	3	1.8			31,600	82	60.5	

LEGEND

- WHF-17-3 Monitoring well location and designation
- 17SB09 Subsurface soil sample location and designation
- Surface runoff pathway and flow direction
- A Pit or pile boundary and designation
- Scrap metal boundary
- Approximate site boundary
- Treeline
- FDEP Florida Department of Environmental Protection
- NAS Naval Air Station

FIGURE 5-4
SUBSURFACE SOIL ANALYTICAL RESULTS

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**REMEDIAL INVESTIGATION REPORT
SITE 17, CRASH CREW
TRAINING AREA**

**NAS WHITING FIELD
MILTON, FLORIDA**

Table 5-12
Summary of Subsurface Soil Organic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection ¹	Range of Detected Concentrations	Detection Limits ²	Background Screening Values ³	USEPA Region III RBCs Industrial ⁴	SCTLs for Florida Residential/Industrial/Leachability ⁵
Volatile Organic Compounds (µg/kg)						
2-Butanone	2/18	20.5* to 34	10 to 15	NA	⁶ 120,000,000	3,100,000/21,000,000/17,000
4-Methyl-2-pentanone (MIBK)	1/18	4 to 4	10 to 15	NA	⁶ 16,000,000	220,000/1,500,000/2,600
Acetone	10/18	11 to 130	10 to 120	NA	⁶ 20,000,000	780,000/5,500,000/2,800
Semivolatile Organic Compounds (µg/kg)						
Di-n-butylphthalate	1/18	310 to 310	340 to 400	NA	⁶ 20,000,000	7,300,000/140,000,000/47,000
Diethylphthalate	1/18	94 to 94	340 to 400	NA	⁶ 160,000,000	54,000,000/920,000,000/41,000
Pesticides and PCBs (µg/kg)						
4,4'-DDE	1/19	6.5 to 6.5	3.4 to 4	12.4	17,000	3,300/13,000/18,000
4,4'-DDT	1/19	19 to 19	3.4 to 4	7.8	17,000	3,300/13,000/11,000
Other (mg/kg)						
Total Recoverable Petroleum Hydrocarbons	4/18	2.5 to 66.2	1.7 to 4.6	ND	--	340/2,500/340

See notes at end of table.

Table 5-12 (Continued)
Summary of Subsurface Soil Organic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).

² If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.

³ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.

⁴ Source: USEPA Region III RBC table (October 1, 1998).

⁵ Source: Chapter 62-777, Florida Administrative Code (FDEP, 1999).

Notes: Background samples: BKG-SL-02, BK-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and, BKS00501.

Background duplicate sample: BKS00201D

USEPA = U.S. Environmental Protection Agency.

RBC = risk-based concentration.

SCTL = soil cleanup target level.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

* = average of sample and its duplicate.

NA = not available or applicable.

-- = number is greater than 1×10^6 or unlisted.

MIBK = methyl 150-butylketone.

PCB = polychlorinated biphenyl.

DDE = dichlorodiphenyldichloroethene.

DDT = dichlorodiphenyltrichloroethane.

mg/kg = milligrams per kilogram.

ND = not detected.

Table 5-13
Summary of Subsurface Soil Inorganic Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection ¹	Range of Detected Concentrations ²	Detection Limits	Background Screening Values ³	USEPA Region III RBCs Industrial ⁴	Cleanup Goals for Florida Residential/Industrial/Leachability ⁵
Inorganic Analytes (mg/kg)						
Aluminum	19/19	347 to 55,200	40 to 40	19,580	⁶ 200,000	72,000/--/SPLP ⁷
Antimony	2/18	7 to 8	2.6 to 12	8	⁶ 82	26/240/5
Arsenic	18/19	0.43 to 8	0.15 to 2	3.6	3.8	0.8/3.7/29
Barium	18/19	0.32 to 14.3	0.1 to 40	30	⁶ 14,000	110/87,000/1,600
Beryllium	5/19	0.13 to 0.45	0.06 to 1	0.38	⁶ 410	120/800/63
Cadmium	2/19	0.75 to 2.5	0.26 to 1	0.58	⁶ 100	75/1,300/8
Calcium	14/19	7.6 to 159	7.2 to 1,000	1,108	--	--/--/--
Chromium	19/19	1.2 to 50.5	2 to 2	14	⁶ 610	210/420/38
Cobalt	9/19	0.57 to 4.4	0.12 to 10	3.4	⁶ 12,000	4,700/110,000/SPLP ⁷
Copper	16/19	1.1 to 22.7	0.34 to 5	9.6	⁶ 10,000	110/76,000/SPLP ⁷
Cyanide	12/19	0.43 to 0.66	0.16 to 1	0.28	⁶ 4,100	30/28,000/40
Iron	19/19	457 to 89,800	20 to 20	11,172	⁶ 61,000	23,000/480,000/SPLP ⁷
Lead	19/19	0.18 to 44.7	1 to 1	11.8	⁶ 400	400/920/SPLP ⁷
Magnesium	17/19	9.4 to 187	7.3 to 1,000	548	--	--/--/--
Manganese	19/19	1.5 to 226	3 to 3	632	⁶ 4,100	1,600/22,000/SPLP ⁷
Mercury	7/19	0.02 to 0.04	0.02 to 0.1	0.1	--	3.4/26/2.1
Nickel	7/19	2.8 to 6.9	1.6 to 8	7.2	⁶ 4,100	110/28,000/130
Potassium	7/19	53.6 to 1,180	40.9 to 1,000	250	--	--/--/--
Selenium	11/19	0.61 to 4.5	0.11 to 1	0.46	⁶ 1,000	390/10,000/5
Silver	10/19	0.69 to 1.4	0.45 to 2	0.78	⁶ 1,000	390/9,100/17
Sodium	11/19	16.4 to 207	11.4 to 1,000	376	--	--/--/--
Vanadium	19/19	1.6 to 105	10 to 10	28	⁶ 1,400	15/7,400/980
Zinc	17/19	0.52 to 18.9	0.37 to 4	17	⁶ 61,000	23,000/560,000/6,000
See notes at end of table.						

Table 5-13 (Continued)
Summary of Inorganic Subsurface Soil Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

- ¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
- ² If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
- ³ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples for Troup and Orangeburg soil types.
- ⁴ For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the USEPA Region III RBC table for industrial soil exposure was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on an excess lifetime cancer risk of 1×10^6 or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report (HLA, 1998).
- ⁵ Chapter 62-777, Florida Administrative Code (FDEP, 1999).
- ⁶ Leachability values may be derived using the SPLP test to calculate site-specific SCTLs or may be determined using TCLP in the event oil wastes are present.
- ⁷ The calculated values correspond to a noncancer hazard quotient of 0.1.
- ⁸ Hexavalent chromium.
- ⁹ USEPA Office of Solid Waste and Emergency Response Directive No. 9355.4-12, Revised Interim Recommended Soil Cleanup for CERCLA and RCRA Sites.

Notes: The average of a sample and its duplicate is used for all table calculations.
Bold indicates analyte exceeded screening criteria.

Background samples: BKG-SL-02, BK-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and, BKS00501.

Background duplicate sample: BKS00201D

USEPA = U.S. Environmental Protection Agency.

RBC = risk-based concentration.

mg/kg = milligrams per kilogram.

SPLP = synthetic precipitation leaching procedure.

NA = not applicable.

-- = number is greater than 1×10^6 or unlisted.

Bold indicates parameter was detected at a concentration greater than regulatory criterion. TRPH was detected in 4 of 19 subsurface soil samples and in no duplicates (Table 5-10). None of the samples exceeded the Chapter 62-777, FAC, industrial and leachability SCTLs of 2,500 mg/kg and 340 mg/kg, respectively (Table 5-10).

Inorganics. Twenty-three inorganic analytes were detected in the subsurface soil samples (Table 5-11). Three inorganics (antimony, arsenic, chromium, and iron) exceeded either USEPA Region III industrial RBCs or Chapter 62-777, FAC, industrial and/or leachability SCTLs (Table 5-13). Arsenic was detected in four subsurface soil samples at concentrations that exceeded State and Federal industrial screening criteria. Vanadium was detected in six samples above the Florida residential SCTL.

Chromium exceeded the Chapter 62-777, FAC leachability SCTL of 38 mg/kg in four samples. Chromium was not detected in any of the subsurface soil samples above the USEPA Region III industrial soil RBC of 610 mg/kg (calculated using a 0.1 noncancer hazard quotient) or the Chapter 62-777, FAC, industrial SCTL of 430 mg/kg.

Iron exceeded the USEPA Region III industrial soil RBC of 61,000 mg/kg (calculated using a 0.1 noncancer hazard quotient) in one sample. Iron did not exceed the Chapter 62-777, FAC, SCTL of 490,000 mg/kg for industrial soil.

5.5 GROUNDWATER ANALYTICAL RESULTS. The groundwater assessment at Site 17 consisted of collecting groundwater samples from four on-site monitoring wells (WHF-17-1, WHF-17-1S, WHF-17-2, and WHF-17-3) during two separate events: Phase IIA (October 1993) and IIB (July 1996). One filtered sample (17G00201F) was collected during Phase IIA. The locations of the Site 17 monitoring wells are shown on Figure 3-3.

5.5.1 Phase II Groundwater Samples Table 5-14 presents field parameter data, and Table 5-15 presents the analytical results for groundwater samples collected at Site 17 during the Phase IIA and IIB sampling events. Below is a discussion of the field parameters and analytical results for the Phase IIA and IIB sampling events.

Field Parameters. The pH values for groundwater samples collected at Site 17 in July 1996 ranged from 5.00 to 5.37 SUs, which is representative of the NAS Whiting Field shallow background monitoring wells average pH of approximately 5.2 SUs. Therefore, groundwater samples collected from background wells are below the lower range of the Florida secondary drinking water requirements of 6.5 SUs.

The temperature measurements in July 1996 ranged from 25.0 to 28.5 degrees Celsius (°C), and the specific conductance ranged from 21 to 31 micromhos per centimeter.

Turbidity measurements for Phase IIA groundwater samples ranged from 2.58 to 1,241 nephelometric turbidity units (NTUs). Turbidity measurements for Phase IIB groundwater samples, collected using low-flow sampling methods, ranged from less than 1.0 to 6.78 NTUs. The low-flow sampling method produces less turbid samples. These samples are more representative of the surficial aquifer than those obtained with a bailer. Therefore, the preferred data set therefore was from the Phase

Table 5-14
Summary of Groundwater Field Parameters

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Monitoring Well Designation	Date Sampled	pH (SU)	Temperature (°C)	Specific Conductance ($\mu\text{mhos}/\text{cm}$)	Turbidity (NTU)	DO (percent)
<u>Phase IIA</u>						
WHF 17-1	19-Oct-93	4.84	24	19	2.58	--
WHF 17-1S	20-Oct-93	5.28	23	23	509	--
WHF 17-2	20-Oct-93	5.13	25	20	257	--
WHF 17-3	21-Oct-93	4.87	22.1	21.5	1,241	--
<u>Phase IIB</u>						
WHF 17-1	18-Jul-96	5.13	26.0	21	0.70	6.4
WHF 17-1S	18-Jul-96	5.00	28.5	29	1.80	6.3
WHF 17-2	18-Jul-96	5.15	25.0	22	1.40	7.5
WHF 17-3	18-Jul-96	5.37	27.0	31	6.78	8.0
Notes: SU = standard unit. °C = degrees Celsius. $\mu\text{mhos}/\text{cm}$ = micromhos per centimeter. NTU = nephelometric turbidity unit. DO = dissolved oxygen. -- = not measured.						

Table 5-15
Summary of Analytical Results for Site 17 Groundwater

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	17G00101	17G00102	17G00201	17G00201F	17G00301
Collect Date	07/18/96	07/18/96	07/18/96	07/18/96	07/18/96
Volatile Organic Compounds ($\mu\text{g/l}$)					
Carbon disulfide	--	--	--	--	2 J
Inorganic Analytes ($\mu\text{g/l}$)					
Aluminum	--	--	1,120	1,390	--
Barium	26.9 J	39.6 J	37.6 J	31.3 J	15.6 J
Beryllium	--	0.4 J	0.52 J	0.52 J	--
Calcium	651 J	8,900	1,910 J	3,230 J	620 J
Chromium	--	--	5.6 J	5.5 J	--
Cobalt	--	5.2 J	--	--	--
Copper	--	--	7.6 J	8 J	--
Cyanide	1.9 J	2.6 J	4.5 J	NA	--
Iron	--	--	1,870	2,150	148
Lead	--	--	2.6 J	3.7	--
Magnesium	757 J	530 J	815 J	830 J	585 J
Manganese	4 J	2.5 J	42.3	41.2	5.2 J
Mercury	--	--	--	--	--
Nickel	--	--	--	9.4 J	--
Potassium	426 J	1,200 J	586 J	658 J	--
Silver	--	--	--	--	--
Sodium	2,080 J	1,570 J	2,930 J	3,600 J	1,520 J
Vanadium	--	--	6.1 J	5.4 J	--
Zinc	--	29	31.7	27.3	--

Notes: $\mu\text{g/l}$ = micrograms per liter.

-- = concentration of analyte, if present, was less than the detection limit

J = estimated value.

NA = not available or applicable.

IIB sampling event. The number and concentration of inorganic analytes detected in groundwater samples collected during the 1996 sampling event are generally lower than the corresponding samples collected during the 1993 sampling event.

The 1993 groundwater analytical data set was not included in the sample summaries because it was superceded by the 1996 data set. The 1996 data set represents the most recent set of groundwater quality data and was used in the risk assessment.

Phase IIB Sampling Event. One VOC, carbon disulfide, was detected in one sample (17G00301) at an estimated 2 $\mu\text{g/l}$. No SVOCs, pesticides, or PCBs were detected in groundwater samples collected from monitoring wells WHF-17-1, WHF-17-1S, WHF-17-2 or WHF-17-3 during phase IIB (Table 5-15).

Inorganic Analytes. Seventeen inorganic analytes, including aluminum, barium, beryllium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc were detected in groundwater samples collected from monitoring wells (WHF-17-1, WHF-17-1S, WHF-17-2 and WHF-17-3) during Phase IIB (Table 5-15). Two inorganics, aluminum and iron, collected in July 1997 had concentrations that exceeded either the Chapter 62-777, FAC, GCTLs or Federal MCLs (Table 5-16).

Table 5-16
Summary of Groundwater Analytical Results

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection ¹	Range of Detected Concentrations ²	Range of Detection Limits	Mean of Detected Concentrations	Background Screening Concentration ³	Federal MCLs ⁴	Florida GCTL ⁵
Volatile Organic Compounds ($\mu\text{g/l}$)							
Carbon disulfide	1/9	2 to 2	10 to 10	2	--	--	700
Inorganic Analytes ($\mu\text{g/l}$)							
Aluminum	2/5	1,120 to 1,390	12.6 to 200	3,910	654	⁷ 200	200
Barium	5/5	15.6 to 39.6	200 to 200	35.4	72.6	2,000	2,000
Beryllium	3/5	0.4 to 0.52	0.2 to 5	0.69	0.94	4.0	4.0
Calcium	5/5	620 to 8,900	5,000 to 5,000	2,603	3,316	--	--
Chromium	2/5	5.5 to 5.6	2 to 10	51.9	30	⁸ 100	100
Cobalt	1/5	5.2 to 5.2	2.3 to 50	6	--	--	420
Copper	2/5	7.6 to 8	1.1 to 25	26.5	10.8	⁹ 1000	1,000
Cyanide	3/5	1.9 to 4.5	1.5 to 10	2.1	7	--	200
Iron	3/5	148 to 2,150	17.8 to 100	19,785	964	⁸ 300	300
Lead	2/5	2.6 to 3.7	0.5 to 5	5.1	--	15	15
Magnesium	5/5	530 to 830	5,000 to 5,000	738	2,426	--	--
Manganese	5/5	2.5 to 42.3	15 to 15	47.3	42.8	⁸ 50	50
Nickel	1/5	9.4 to 9.4	7.3 to 40	35.8	42.8	100	100
Potassium	4/5	426 to 1,200	316 to 5,000	1,021	1,528	--	--
Sodium	5/5	1,520 to 3,600	5,000 to 5,000	2,588	4,772	--	160,000
See notes at end of table.							

Table 5-16 (Continued)
Summary of Groundwater Analytical Results

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Frequency of Detection ¹	Range of Detected Concentrations ²	Range of Detection Limits	Mean of Detected Concentrations	Background Screening Concentration ³	Federal MCLs ⁴	Florida GCTL ⁵
Inorganic Analytes ($\mu\text{g}/\ell$) (Continued)							
Vanadium	2/5	5.4 to 6.1	1.2 to 50	91.4	3.8	--	49
Zinc	3/5	27.3 to 31.7	1.4 to 20	50.1	200	⁶ 5,000	5,000

¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).

² For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit (CRQL/CRDL) is used as a surrogate concentration for the nondetect.

³ The background screening value for organic compounds is the arithmetic mean concentration of background samples and twice the average of detected concentrations for inorganic analytes in background samples.

⁴ Source: USEPA Drinking Water Regulations and Health Advisories, October 1, 1996.

⁵ Chapter 62-777, Florida Administrative Code.

⁶ Secondary MCL.

⁷ No MCL has been determined for sodium but a reporting limit of 20,000 $\mu\text{g}/\ell$ has been established.

Notes: MCL = maximum contaminant level.

GCTL = groundwater cleanup target level.

$\mu\text{g}/\ell$ = micrograms per liter.

-- = criteria not available.

6.0 HUMAN HEALTH RISK ASSESSMENT

An HHRA has been conducted as part of the RI/FS for Site 17 at NAS Whiting Field. The purpose of the HHRA is to characterize the risks associated with the hypothetical exposures to site-related chemicals. This HHRA is conducted in accordance with the following guidance documents:

- *Risk Assessment Guidance for Superfund, Volumes I and II, Evaluation Manual (Part A)* (USEPA, 1989a),
- *Guidance for Data Useability in Risk Assessment (Part A)*, Final (USEPA, 1992a), and
- Region IV Risk Assessment Guidance (USEPA, 1995a).

Additionally, the HHRA considers the following FDEP guidance:

- Cleanup Target Levels, Chapter 62-777, FAC (FDEP, 1999)

The methodology for this HHRA is described in Chapter 2 of the GIR (HLA, 1998). The HHRA methodology presented in the GIR (HLA, 1998) consists of the following steps:

- data evaluation
- selection of chemicals of potential concern
- exposure assessment
- toxicity assessment
- risk characterization

The location, physical description, and history associated with Site 17 are described in Chapter 1.0 of this report. During the RI, surface soil, subsurface soil, and groundwater were collected from Site 17. Sampling locations and the sampling rationale are presented in Chapters 3 and 5 of this report.

6.1 DATA EVALUATION. The data evaluation involves numerous activities, including sorting data by medium, evaluating sample quantitation limits (SQLs), and evaluating the quality of data with respect to qualifiers.

The data for Site 17 were divided into the following categories: surface soil, subsurface soil, groundwater, and background (for each medium).

Soil SQLs are compared to USEPA Region III RBCs (USEPA, 1998a), and Florida SCTLs (FDEP, 1999). Surface and subsurface soil SQLs were compared to Region III RBCs for soils and Florida SCTLs for residential and industrial scenarios, respectively. Groundwater SQLs were compared to Florida GCTLs (FDEP, 1999) and Region III tap water RBCs (USEPA, 1998a). Analyte-specific SQLs that are above USEPA Region III RBCs (USEPA, 1998a), and Florida screening concentrations are identified and discussed in the uncertainty analysis.

The quality of the data was evaluated with respect to the data qualifiers. Only data of sufficient quality were retained for evaluation in the HHRA. The HHRA

considers data with "J", "U", and "UJ", as well as data with no qualifier (GIR, HLA, 1998, Subsection 2.3.3).

6.2 SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN. The human health chemicals of potential concern (HHCPCs) were selected per the methodology described in Section 2.5 of the GIR (HLA, 1998). This HHCPC methodology considers 1) frequency of detection, 2) consistency with background conditions, 3) a comparison to regulatory and risk-based screening values, and 4) a comparison to essential nutrient levels.

In selecting HHCPCs, Chapter 62-777, FAC, SCTLs and USEPA Region III were used. For each medium, the following criteria were employed to exclude detected analytes from the list of HHCPCs. Each criterion by itself is justification for excluding the analyte.

Less than 5 Percent Frequency of Detection. If an analyte has a frequency of detection (number of samples in which the analyte is detected divided by the number of samples analyzed for that analyte) less than 5 percent (USEPA, 1989a) and is not selected as an HHCPC in another medium, it is not selected as an HHCPC. These selection criteria are used only when there are 20 or more samples in the media of concern.

Less than Background Screening Concentrations. If the maximum detected concentration of an analyte was less than twice the arithmetic mean of the background concentration (inorganics only), the analyte was not selected as an HHCPC (USEPA, 1995c). The background screening values for surface soil, subsurface soil, and groundwater are identified below.

- A representative surface soil background data set consisting of Troup Loamy lakeland soil type is used for background screening of Sites 17 surface soil samples. Sample locations are identified on Figure 3-10 and are discussed in Subsection 3.3.1 of the GIR (HLA, 1998). The background surface soil data used for screening surface soils at Site 17 are presented in Tables 3-8 and 3-10 of the GIR (HLA, 1998).
- Background subsurface soil sample locations are identified on Figure 3-11 and discussed in Subsection 3.3.2 (HLA, 1998). Tables 3-15 through 3-17 present the background screening data and Table 3-18 presents summary statistics for screening subsurface soil at Site 17.
- Background groundwater sample locations are identified on Figure 3-12 and discussed in Subsection 3.3.3 of the GIR (HLA, 1998). Tables 3-21 through 3-23 of the GIR (HLA, 1998) present background screening data for groundwater. Table 3-24 of the GIR (HLA, 1998) presents the summary statistics used for screening the groundwater at Site 17.

Less than Risk-Based Screening Concentrations, Standards, and Guidelines. If the maximum detected concentration of the analyte in a medium was less than its corresponding USEPA Region III RBC adjusted noncarcinogenic value (USEPA, 1998a), and less than its Federal and Florida standards and guidelines, the analyte was not selected as an HHCPC (USEPA, 1995a). The target hazard quotient (HQ) in the USEPA Region III RBC table is 1 and the

target cancer risk is 1×10^{-6} . All RBCs based on noncarcinogenic effects were adjusted for a target HQ of 0.1 per Region IV guidance (USEPA, 1995a).

The residential soil RBCs were used for surface soil. The industrial soil RBCs were used for subsurface soil. No RBC was available for lead in soil due to a lack of toxicity data. Based on USEPA recommendation, a screening level of 400 mg/kg for lead under residential land use was used as the RBC for lead in soil (USEPA, 1994c). The maximum detected concentrations of analytes in surface soil were also compared to the Chapter 62-777, FAC, residential SCTLs (FDEP, 1999). The maximum detected concentration of any organic analyte in surface soil that was also detected in groundwater (above Federal or State standards) was compared to the Chapter 62-777, FAC, leachability SCTL (FDEP, 1999).

Tap water RBCs (USEPA, 1998a) and Florida GCTLs (FDEP, 1999) were used for groundwater.

Less than Essential Nutrient Screening Values. If the maximum detected concentration of an essential nutrient (i.e., sodium, potassium, magnesium, chloride, iodine, phosphorus, and calcium) in a medium was below a toxic level and consistent with or only slightly above its background concentration, the essential nutrient is not selected as an HHCPC. The derivation of essential nutrient screening values is presented in Appendix C-1 of the GIR.

Detected concentrations were not screened using the iron essential nutrient value; the RBC for iron was used instead. However, if iron is determined to be a risk driver, a comparison of the risk concentrations against the essential nutrient level for iron will be presented in the uncertainty section for that medium.

If the analyte meets any of the above criteria, is not a member of the same chemical class as other HHCPCs in the medium, and is not a breakdown product of other HHCPCs in the medium, then the analyte was not selected as a chemical of potential concern (CPC). In situations where multiple screening values are available (excluding background screening values), a chemical was excluded only if its maximum screening concentration was less than all of the corresponding screening values. Tables D-1, D-2, and D-3 in Appendix D present the RBCs, regulatory guidance values, and applicable or relevant and appropriate requirement (ARARs) that were used in HHCPC selection. After applying these criteria with professional judgment, HHCPCs are identified for each medium. HHCPC selection for each medium was presented below in Subsections 6.2.1 through 6.2.3.

6.2.1 Surface Soil Thirty four samples (17-SL-1 through 17-SL-34) and three duplicates (17-SL-11A, 17-SL-17A, and 17-SL-21A) were collected from Site 17 (listed in the footnotes of Table 6-1). The sample locations and raw data are presented on Figure 3-1 and in the GIR (HLA, 1998). VOCs, SVOCs, inorganics, and TRPH data from all of these samples are evaluated in this HHRA. Table 6-1 identifies seven inorganics analytes (aluminum, antimony, arsenic, cadmium, chromium, iron, and vanadium) and TRPH as HHCPCs for surface soil at Site 17.

6.2.2 Subsurface Soil Fifteen subsurface soil sample (listed in the footnotes of Table 6-2) and a duplicate sample were collected from Site 17 (Figure 3-2).

Table 6-1
Selection of Human Health Chemicals of Potential Concern for Surface Soil

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Milton, Florida

Analyte	Frequency of Detection ¹	Range of Reporting Limits	Range of Detected Concentrations ²	Mean of Detected Concentrations ³	Background Screening Concentration ⁴	Selected Screening Concentration ⁵	Analyte HHCPC? (Yes/No)	Reason ⁶
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
2-Butanone	3/34	11 to 8,250	6 to 80	47	NA	3,100,000	No	S
Carbon disulfide	14/34	5 to 4,015	1 to 26	4.3	NA	200,000	No	S
Ethylbenzene	6/34	5 to 4,015	2 to 14,000	3,900	NA	1,100,000	No	S
Methylene chloride	2/34	6 to 4,015	69 to 130	100	NA	16,000	No	S
Toluene	4/34	5 to 4,015	1 to 23,000	5,800	NA	380,000	No	S
Trichloroethene	2/34	5 to 4,015	2 to 160	81	NA	6,000	No	S
Xylenes (total)	20/34	5 to 4,015	1 to 130,000	9,700	NA	5,900,000	No	S
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
2-Methylnaphthalene	5/34	360 to 9,900	190 to 4,900	2,600	NA	80,000	No	S
Butylbenzylphthalate	3/34	360 to 9,900	360 to 490	420	NA	1,600,000	No	S
Naphthalene	6/34	360 to 9,900	81 to 7,200	2,000	NA	40,000	No	S
bis(2-Ethylhexyl)phthalate	7/34	360 to 9,900	49 to 750 *	350	NA	46,000	No	S
Inorganic Analytes (mg/kg)								
Aluminum	34/34	NA	4,500 to 29,900	13,700	19,580	7,800	Yes	
Antimony	3/34	2.7 to 12	3.3 to 10.3	5.9	8	3.1	Yes	
Arsenic	33/34	1.55 to 2	0.29 to 5.9	2.2	3.6	0.43	Yes	
Barium	34/34	NA	3.6 to 145	28.8	30	105	Yes	
See notes at end of table.								

Table 6-1 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Frequency of Detection ¹	Range of Reporting Limits	Range of Detected Concentrations ²	Mean of Detected Concentrations ³	Background Screening Concentration ⁴	Selected Screening Concentration ⁵	Analyte HHCPC? (Yes/No)	Reason ⁶
Inorganic Analytes (mg/kg) (Continued)								
Beryllium	25/34	0.05 to 1	0.055* to 0.22	0.12	0.38	16	No	B
Cadmium	15/34	0.59 to 1	0.76 to 26.5*	5.2	0.58	3.9	Yes	
Calcium	32/34	343.5 to 1,000	94.9 to 780	258	1,108	1,000,000	No	B,S
Chromium	34/34	NA	4 to 82.1	20	14	23	Yes	
Cobalt	30/34	0.37 to 10	0.59 to 2.4	1.4	3.4	470	No	B,S
Copper	34/34	NA	2.4 to 218	34.6	9.6	110	Yes	
Iron	34/34	NA	2,550 to 23,800	7,740	11,172	2,300	Yes	
Lead	34/34	NA	3 to 207	46.2	11.8	400	No	S
Magnesium	34/34	NA	59.1 to 502*	185	548	460,468	No	B,S
Manganese	34/34	NA	5.1 to 198	56.5	632	160	No	B
Nickel	22/34	2.3 to 8	2* to 11.6*	4.4	7.2	105	No	S
Potassium	25/34	131 to 1,000	153 to 1,350	432	250	1,000,000	No	S
Silver	4/34	0.32 to 2	0.355* to 0.53	0.45	0.78	39	No	B,S
Sodium	32/34	198 to 1,000	133 to 279	191	376	1,000,000	No	B,S
Vanadium	34/34	NA	6.4 to 71.3	20.3	28	15	Yes	
Zinc	34/34	NA	7.2 to 179	37	17	2,300	No	S

See notes at end of table.

Table 6-1 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil

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Analyte	Frequency of Detection ¹	Range of Reporting Limits	Range of Detected Concentrations ^{2*}	Mean of Detected Concentrations ³	Background Screening Concentration ⁴	Selected Screening Concentration ⁵	Analyte HHCPC? (Yes/No)	Reason ⁶
<u>Other (mg/kg)</u>								
TRPH	30/34	1.8 to 2	2.3 to 19,300	3,090	NA	340	Yes	

¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).

² A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.

³ The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.

⁴ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.

⁵ For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) table for residential soil exposure per October 1998 guidance (USEPA, 1998a) or the Florida Soil Cleanup Target levels (SCTLs) for residential scenarios (FDEP, 1999) was used for screening. For analytes that are HHCPCs in groundwater, the Florida SCTLs based on leachability are used for screening; however, there were no HHCPCs selected in groundwater at Site 18. Values from the USEPA Region III RBC Tables, dated October 1998, are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (Office of Solid Waste and Emergency Response Directive 93554.4-12) (USEPA, 1994c). Values are presented in Appendix of this RI report.

⁶ Analyte was excluded from the risk assessment for the following reasons:

B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.

S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.

Samples: 17-SL-01, through 17-SL-34.

Sample duplicates: 17-SL-11A, 17-SL-17A, 17-SL-21A.

Background samples: BKG-SL-02, BKG-SL-03, BKG-SL-04, BKG-SL-05, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00301, BKS00401, and BKS00501.

Background duplicate sample: BKS00201D.

HHCPC = human health chemical of potential concern.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

NA = not applicable.

* = average of a sample and its duplicate.

mg/kg = milligrams per kilogram.

Table 6-2

**Remedial Investigation Report
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Naval Air Station Whiting Field
Milton, Florida**

Milton, Florida								
Analyte	Frequency of Detection ¹	Range of Reporting Limit	Range of Detected Concentrations ²	Mean of Detected Concentrations ³	Background Screening Concentration ⁴	Selected Screening Concentration ⁵	Analyte HHCP? (Yes/No)	Reason ⁶
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
2-Butanone	2/15	11 to 13	20.5* to 34	27	NA	21,000,000	No	S
4-Methyl-2-pentanone	1/15	11 to 13	4	4	NA	1,500,000	No	S
Acetone	8/15	11 to 120	11 to 130	43	NA	5,500,000	No	S
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)								
Di-n-butylphthalate	1/15	350 to 400	310	310	NA	20,000,000	No	S
Diethylphthalate	1/15	350 -400	94	94	NA	160,000,000	No	S
Pesticides and PCBs ($\mu\text{g}/\text{kg}$)								
4,4'-DDE	1/15	3.5 to 4	6.5	6.5	NA	3,200	No	S
4,4'-DDT	1/15	3.5 to 4	19	19	NA	3,200	No	S
Inorganic Analytes (mg/kg)								
Aluminum	15/15	NA	3,730 to 55,200	19,900	27,834	200,000	No	S
Antimony	2/14	2.6 to 12	7 to 8	7.5	4.4	82	No	S
Arsenic	15/15	NA	0.5 to 8	2.9	6.2	3.7	Yes	
Barium	15/15	NA	1.5 to 14.3	5.5	15.8	14,000	No	B, S
Beryllium	4/15	0.06 to 1	0.13 to 0.45	0.27	0.26	410	No	S

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil

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 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Frequency of Detection ¹	Range of Reporting Limit	Range of Detected Concentrations ²	Mean of Detected Concentrations ³	Background Screening Concentration ⁴	Selected Screening Concentration ⁵	Analyte HHCPC? (Yes/No)	Reason ⁶
Inorganic Analytes (mg/kg) (Continued)								
Cadmium	2/15	0.26 to 1	0.75 to 2.5	1.6	0.92	100	No	S
Calcium	10/15	7.2 to 1,000	16.9 to 159	90	444	1,000,000	No	B, S
Chromium	15/15	NA	4.8 to 50.5	25.5	22.8	420	No	S
Cobalt	9/15	0.5 to 10	0.57 to 4.4	1.8	1.48	12,000	No	S
Copper	13/15	0.39 to 5	1.4 to 22.7	6.4	8.8	8,200	No	S
Cyanide	9/15	0.16 to 1	0.45 to 0.66	0.51	ND	4,100	No	S
Iron	15/15	NA	6,240 to 89,800	29,100	18,110	61,000	Yes	
Lead	15/15	NA	0.92 to 44.7	7.7	8.4	400	No	S
Magnesium	14/15	43.45 to 1,000	18.3 to 187	85.6	272	460,468	No	B, S
Manganese	15/15	NA	12.4 to 226	46.8	42.6	4,100	No	S
Mercury	6/15	0.02 to 0.1	0.02 to 0.04	0.03	ND	26	No	S
Nickel	6/15	1.6 to 8	3.1 to 6.9	4.2	5	4,100	No	S
Potassium	7/15	40.9 to 1,000	53.6 to 1,180	444	181	1,000,000	No	S
Selenium	9/15	0.11 to 1	0.61 to 4.5	2	0.3	1,000	No	S
Silver	10/15	0.45 to 2	0.69 to 1.4	1.1	1.12	1,000	No	S
Sodium	10/15	12.2 to 1,000	16.4 to 207	108	ND	1,000,000	No	S
Vanadium	15/15	NA	15.7 to 105	62.8	45	1,400	No	S
Zinc	13/15	0.37 to 4	1.6 to 18.9	5.2	15.6	61,000	No	S

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Frequency of Detection ¹	Range of Reporting Limit	Range of Detected Concentrations ²	Mean of Detected Concentrations ³	Background Screening Concentration ⁴	Selected Screening Concentration ⁵	Analyte HHCPC? (Yes/No)	Reason ⁶
<u>Other (mg/kg)</u>								
Total petroleum hydrocarbons	4/15	1.7 to 4.6	2.5 to 66.2	19.3	NA	2,500	No	S

¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).

² A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.

³ The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.

⁴ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.

⁵ For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) table for industrial soil exposure per October 1998 guidance (USEPA, 1998a) or Florida Soil Cleanup Target Levels industrial scenario (FDEP, 1999) was used for screening. For analytes that are HHCPCs in groundwater, the Florida Soil Cleanup Goals based on leachability are used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (Office of Solid Waste and Emergency Response Directive 9355.4-12) (USEPA, 1994c).

⁶ Analyte was included or excluded from the risk assessment for the following reasons:

B = the maximum detected concentration did not exceed the background; therefore, the analyte will not be considered further.

S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.

Samples: 17SB1-5-7, 17SB2-10-12, 17SB2-5-7, 17SB3-10-12, 17SB4-10-12, 17SB4-5-7, 17SB5-10-12, 17SB5-5-7, 17SB6-5-7, 17SB6-10-12, 17SB7-5-7, 17SB8-10-12, 17SB8-5-7, 17SB9-10-12, 17SB9-5-7. Data for samples greater than 12 feet below land surface not used in human health risk assessment because exposure would not be expected.

Duplicate sample: 17SB5-5-7A.

Background samples: BKB00101, BKB00102, BKB00201, BKB00202, BKB00301, BKB00302, BKB00401, BKB00402, BKB00501, BKB00502, BKB00601, BKB00602, BKB00701, BKB00702.

Background duplicate samples: BKB00401D and BKB00602D.

Re-analysis sample: 17SB-5-7-RE (used in place of 17SB-5-7 for volatile organic compounds).

HHCPC = human health chemical of potential concern.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

* = average of a sample and its duplicate.

NA = not applicable.

PCB = polychlorinated biphenyl.

DDE = dichlorodiphenyldichloroethene.

DDT = dichlorodiphenyltrichloroethane.

mg/kg = milligrams per kilogram.

ND = not detected in any background sample.

VOCs, SVOCs, pesticides, inorganics, and TRPH data from these sample are evaluated in this HHRA. Table 6-2 identifies two inorganic analytes (arsenic and iron) as HHCPCs for subsurface soil at Site 17.

6.2.3 Groundwater Four groundwater samples were collected from Site 17 (samples are identified in the notes of Table 6-3). The sample locations and raw data are presented on Figure 3-3 and in the GIR (HLA, 1998). Only unfiltered groundwater samples collected in 1996 were considered in this HHRA. VOCs and inorganics data from these samples are evaluated in this HHRA. Table 6-3 identifies two inorganics (aluminum and iron) as HHCPCs for groundwater at Site 17.

6.3 EXPOSURE ASSESSMENT. The exposure assessment methodology is described in Subsection 2.5.3 of the GIR (HLA, 1998). This process involves several steps including

- characterization of the exposure setting in terms of physical characteristics and the populations that may hypothetically be exposed to site-related chemicals;
- identification of potential exposure pathways and receptors; and
- quantification of exposure for each population in terms of the amount of chemical either ingested, inhaled, or absorbed through the skin from all complete or hypothetically complete (potential future) exposure pathways.

Summaries of hypothetical exposure pathways to chemicals detected at Site 17 are presented on Figure 6-1.

The exposure pathways, including medium and route of exposure, the hypothetical exposed population, and the rationale for pathway selection or exclusion are provided in Table 6-4 and are described in more detail in Subsections 6.3.1 through 6.3.3. Receptor-specific exposure parameters for each exposure scenario are presented in Appendix C to the GIR (HLA, 1998). Risk calculation spreadsheets in Appendix C to this RI report also contain the assumptions for exposure parameters and quantitation of exposures.

6.3.1 Surface Soil Currently, Site 17 is not being used. No humans currently reside or work at Site 17. The site is not fenced in and there is easy access for a trespasser. In addition, routine site activities would be conducted by a maintenance worker. Therefore, adult and adolescent trespassers and site maintenance workers will be evaluated as a current exposure scenario.

There is not a reuse plan for Site 17; therefore, Site 17 could be developed eventually for residential land use. Thus, the residential receptor will be evaluated as part of the hypothetical future land-use scenario. Also, because there are no buildings currently at the site, exposure to occupational workers will only be considered as part of the future land-use scenario. Other possible future exposure scenarios include excavation activities, associated with the installation of utility lines, and continuing site maintenance associated with activities such as mowing the grass.

Table 6-3
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater

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Milton, Florida

Analyte	Frequency of Detection ¹	Reporting Limit Range	Detected Concentrations Range ²	Mean of Detected Concentrations ³	Background Screening Concentration ⁴	Selected Screening Concentration ⁵	Analyte HHCP? (Yes/No)	Reason ⁶
Volatile Organic Compounds ($\mu\text{g/l}$)								
Carbon disulfide	1/4	10	2	2	NA	100	No	S
Inorganic Analytes ($\mu\text{g/l}$)								
Aluminum	1/4	12.6 to 26.7	1,120	1,120	654	50	Yes	
Barium	4/4	NA	15.6 to 39.6	29.9	72.6	260	No	B, S
Beryllium	2/4	0.3	0.4 to 0.52	0.46	0.94	4	No	B
Calcium	4/4	NA	620 to 8,900	3,020	3,316	1,055,398	No	S
Chromium	1/4	2	5.6	5.6	30	11	No	B, S
Cobalt	1/4	2.3	5.2	5.2	ND	220	No	S
Copper	1/4	1.1	7.6	7.6	10.8	150	No	B, S
Cyanide	3/4	1.5	1.9 to 4.5	3	7	73	No	B, S
Iron	2/4	17.8 to 21.4	148 to 1,870	1,010	964	300	Yes	
Lead	1/4	0.5 to 0.6	2.6	2.6	ND	15	No	S
Magnesium	4/4	NA	530 to 815	672	2,426	118,807	No	B, S
Manganese	4/4	NA	2.5 to 42.3	13.5	42.8	50	No	B, S
Potassium	3/4	316	426 to 1,200	737	1,528	297,016	No	B, S
Sodium	4/4	NA	1,520 to 2,930	2,030	4,772	160,000	No	B, S
Vanadium	1/4	1.2	6.1	6.1	3.8	26	No	S
Zinc	2/4	1.4 to 2	29 to 31.7	30.4	200	1,100	No	B, S
See notes at end of table.								

Table 6-3 (Continued)
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater

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- ¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
- ² For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
- ³ The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
- ⁴ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
- ⁵ For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA), Region III Risk-Based Concentration (RBC) table for tap water exposure per October 1998 guidance (USEPA, 1998a) or the Florida Groundwater Cleanup Target Levels (FDEC, 1999) was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendix C.
- ⁶ Analyte was included or excluded from the risk assessment for the following reasons:
- B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
- S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.

Samples: 17G00101, 17G00102, 17G00201, 17G00301.

Background samples: BKG00101, BKG00102, BKG00103, BKG00201, BKG00202, BKG00203, and BKG00301.

Background duplicate sample: BKG00101D.

HHCPC = human health chemical of potential concern.

$\mu\text{g/l}$ = micrograms per liter.

NA = not applicable.

ND = not detected in any background samples.

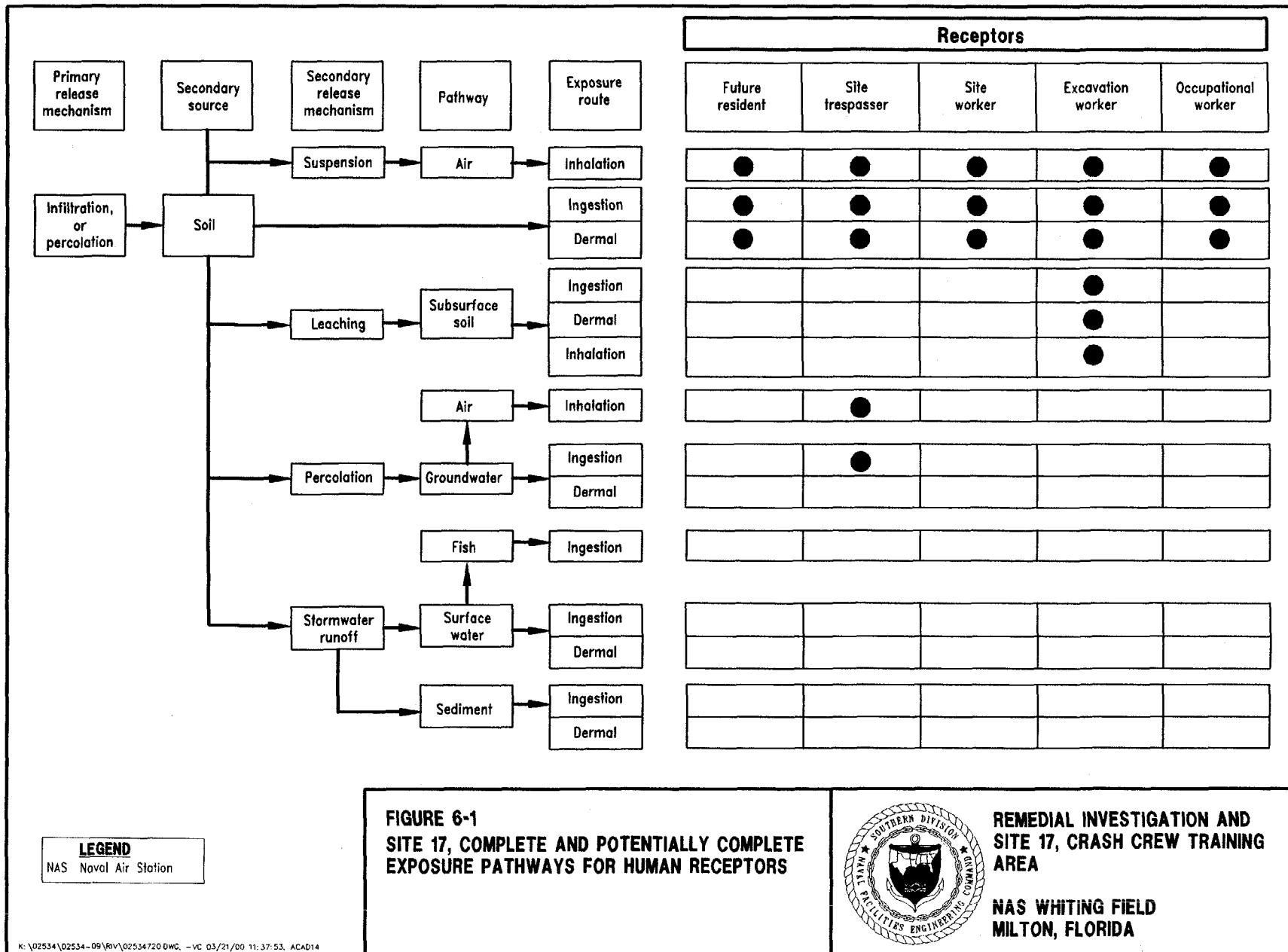


Table 6-4
Summary of Potential Exposure Pathways

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Medium of Exposure	Route of Exposure	Potentially Exposed Population	Selected for Evaluation ?	Reason for Selection or Evaluation
<u>Current Land Use</u>				
Surface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (adult and child) Trespasser (adult and adolescent) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	No Yes No Yes No	No humans currently reside or work at Site 17. Adolescents and adults may be exposed to contaminants in the surface soil while trespassing. The site maintenance workers may be exposed to contaminants in surface soil, while performing routine site activities.
Subsurface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation Worker	No	There are no excavation activities currently at Site 17.
Groundwater	Ingestion of groundwater as drinking water	Resident (adult)	No	There are no current exposures to groundwater; groundwater is not used as a potable or nonpotable water source.
<u>Future Land Use</u>				
Surface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (child and adult) Trespasser (adolescent and adult) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	Yes Yes Yes Yes Yes	If Site 17 is developed for residential use, residents could be exposed to chemicals in surface soil. Exposure of trespassers, occupational workers, site maintenance workers, and excavation workers to human health chemicals of potential concern (HHCPs) in surface soil are possible.
Subsurface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation Worker	Yes	It is possible that an excavation worker could be exposed to subsurface soil in the future if the site is developed; therefore, this hypothetical exposure pathway is evaluated in this human health risk assessment.
Groundwater	Ingestion of groundwater as drinking water.	Resident (adult and child)	Yes	Although it is not anticipated that groundwater in the vicinity of Site 17 will be used as a source of potable or nonpotable water, the groundwater is evaluated for hypothetical future residential use. The volatile inhalation pathway is not complete since no volatile HHCPs were detected in groundwater.

Exposures of hypothetical future residents (adult and child), hypothetical future occupational workers, current and hypothetical future site maintenance workers, hypothetical future excavation workers, and current and hypothetical future trespassers (adult and child) to surface soil contaminants through ingestion, dermal contact, and inhalation of particulates are evaluated in this HHRA.

6.3.2 Subsurface Soil Currently there are no receptors exposed to subsurface soil because no excavation or construction activities are ongoing at Site 17. However, if Site 17 is developed for residential or industrial use, or if excavation activities occur in the future, an excavation worker could be exposed to contaminants in subsurface soil. Therefore, exposure of excavation or construction workers to contaminants in subsurface soil (incidental ingestion, dermal contact, and inhalation of fugitive dust) are evaluated in this HHRA.

6.3.3 Groundwater Currently, groundwater at Site 17 is not used for any potable or nonpotable purpose, nor are there plans to use the water resource in the foreseeable future. However, in the event that Site 17 or areas hydraulically downgradient of Site 17 are developed, the exposure pathway to analytes in groundwater could become complete. Therefore, hypothetical future residential use of groundwater is evaluated in this HHRA as a worst-case estimate of hypothetical future receptors. Only the ingestion exposure pathway is evaluated; no VOCs were selected HHCPCs; therefore, the volatile inhalation pathway (for showering) is not complete.

6.3.4 Exposure Point Concentrations (EPCs) EPCs for all HHCPCs in surface soil, subsurface soil, and groundwater were developed as described in Paragraph 2.5.3.3 of the GIR (HLA, 1998). The EPC of each HHCPC is the lesser of the maximum detected concentration or the 95th percent upper confidence limit (UCL) of the arithmetic mean concentration for soils. The EPC of each HHCPC in groundwater is the lesser of the maximum detected concentration and the arithmetic mean of the samples collected within the groundwater plume. No groundwater plume was identified at Site 17. Therefore, the maximum detected concentration of all groundwater samples was used as the EPC to provide a conservative assessment.

The EPCs are used in a quantification process that involves developing assumptions regarding exposure frequency and intensity for each receptor, to estimate the total amount of HHCPCs that a hypothetical receptor may ingest, dermally absorb, or inhale from each exposure pathway. The ultimate goal of this step, as defined in USEPA guidance, is to identify the combination of these exposure variables or parameters that results in the most intense level of exposure that may "reasonably" be expected to occur under current and future site conditions (USEPA, 1989b).

The EPCs for HHCPCs in surface soil, subsurface soil, and groundwater for Site 17 are presented in Tables 6-5 through 6-7, respectively. The EPCs were used with receptor-specific exposure parameters to quantify exposures to the HHCPCs, as shown in the risk calculation spreadsheets in Appendix C to this report.

6.4 TOXICITY ASSESSMENT. The toxicity assessment methodology is described in Subsection 2.5.4 of the GIR (HLA, 1998). The toxicity assessment evaluates the available evidence on the hypothetical adverse effects associated with exposure to each HHCPC. This information is used to develop a relationship between the extent of exposure and the likelihood or severity of adverse human health effects.

Table 6-5
Exposure Point Concentrations for Human Health
Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
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Analyte	Frequency of Detection ¹	Maximum Detected Concentration	95% UCL ²	Exposure Point Concentration ³
Inorganic Analytes (mg/kg)				
Aluminum	34/34	29,900	17,000	17,000
Antimony	3/34	10.3	2	2
Arsenic	33/34	5.9	2.8	2.8
Cadmium	15/34	26.5	3.7	3.7
Chromium	34/34	82.1	25.5	25.5
Iron	34/34	23,800	9,510	9,510
Vanadium	34/34	71.3	25	25
Other (mg/kg)				
Total recoverable petroleum hydrocarbons	30/34	19,300	1,000,000	19,300

¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).

² 95% UCL of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects.

³ Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
 UCL = upper confidence limit (see footnote 2).
 mg/kg = milligrams per kilogram.

Table 6-6
Exposure Point Concentrations for Human Health
Chemicals of Potential Concern for Subsurface Soil

Remedial Investigation Report
 Site 17, Crash Crew Training Area
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Analyte	Frequency of Detection ¹	Maximum Detected Concentration	95% UCL ²	Exposure Point Concentration ³
Inorganic Analytes (mg/kg)				
Arsenic	15/15	8	5.3	5.3
Iron	15/15	89,800	47,600	47,600

¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
² 95% UCL of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects.
³ Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
 UCL = upper confidence limit.
 mg/kg = milligrams per kilogram.

Table 6-7
Exposure Point Concentrations for Human Health
Chemicals of Potential Concern for Groundwater

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Frequency of Detection ¹	Maximum Detected Concentration	Arithmetic Mean ²	Exposure Point Concentration ³
Inorganic Analytes (µg/l)				
Aluminum	1/4	1,120	287	1,120
Iron	2/4	1,870	509	1,870

¹ Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
² Arithmetic mean of all samples calculated using one-half the contract-required quantitation limit and contract-required detection limit for nondetects.
³ Exposure point concentration is the lower of either the mean concentration or maximum detected concentration.

Note: µg/l = micrograms per liter.

Two steps are typically associated with toxicity assessment: hazard identification and dose-response assessment.

- Hazard identification is the process of determining if exposure to an agent can cause a particular adverse health effect and, more importantly, if that effect will occur in humans. The objectives of the hazard identification in the HHRA are to (1) identify which of the contaminants detected at the site are hypothetical hazards, and (2) summarize their potential toxicity in brief nontechnical language.
- A dose-response assessment is conducted to characterize and quantify the relationship between intake, or dose, of an HHCPC and the likelihood of a toxic effect or response. There are two categories of toxic effects evaluated in this HHRA: carcinogenic and noncarcinogenic. Following USEPA guidance for HHRA (USEPA, 1989b), these two endpoints (cancer and noncancer) are evaluated separately. As a result of the dose-response assessment, identified dose-response values are used to estimate the incidence of adverse effects as a function of human exposure to a chemical.

Appendix D to this report contains brief toxicity summaries for HHCPCs identified in surface soil, subsurface soil, and groundwater at Site 17. Appendix D to this report also contains dose-response information for the HHCPCs (Tables D-4 through D-9). Dose-response values used in this HHRA were current as of April 1998 for the Integrated Risk Information System (IRIS) and July 1997 for Health Effects Assessment Summary Tables (HEAST).

6.5 RISK CHARACTERIZATION. Risk characterization is the final step in the risk assessment process. This step involves the integration of the exposure and toxicity assessments into a qualitative or quantitative expression of potential human health risks associated with contaminant exposure. Quantitative estimates of both carcinogenic and noncarcinogenic risks are made for each HHCPC and each complete exposure pathway identified in the exposure assessment. The risk characterization methodology is described in Subsection 2.5.5 of the GIR (HLA, 1998).

Risk estimates for hypothetical exposures to surface soil, subsurface soil, and groundwater under current and hypothetical future land-use scenarios are discussed below in Subsections 6.5.1 through 6.5.4. These risk estimates are then compared to Federal USEPA and FDEP carcinogenic and noncarcinogenic target levels.

The USEPA guidelines, established in the NCP, indicate that the total lifetime cancer risk due to exposure to the HHCPCs at a site, by each complete exposure pathway, should not exceed a range of 1 in 1,000,000 (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) (USEPA, 1990). FDEP has indicated that chemical-specific risks greater than one in one million (1×10^{-6}) warrant further consideration.

An HQ less than 1 indicates that noncarcinogenic toxic effects are not expected to occur due to HHCPC exposure. Hazard indices (HIs) greater than 1 may be indicative of a possible noncarcinogenic toxic effects, but the circumstances must be evaluated on a case-by-case basis (USEPA, 1989b). As the HI increases, so does the likelihood that adverse effects might be associated with exposure. Both USEPA and FDEP consider chemicals with HIs greater than 1 to warrant further evaluation

and to require target organ-specific evaluation of the potential noncarcinogenic effects.

Table 6-8 summarizes the cancer and noncancer risk for the current land use at Site 17. Table 6-9 summarizes the cancer and noncancer risk for the hypothetical future land use at Site 17.

6.5.1 Surface Soil The risk calculations for surface soil exposure are shown in Tables D-10 through D-23 in Appendix D to this report. For the current land-use scenario, the cancer risks associated with exposure to surface soil (ingestion, dermal contact, and fugitive dust inhalation) are 4×10^{-7} for an aggregate (combined adult and adolescent) trespasser and 1×10^{-7} for a site maintenance worker (Table 6-8). The cancer risk values for both receptors are below the USEPA acceptable cancer risk range of 1 in 10,000 to 1 in 1,000,000 and FDEP target risk level of 1 in 1,000,000. The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation exposure pathways under current land use (adolescent trespasser, adult trespasser, and site worker) are below USEPA's target HI of 1. Figures 6-2 and 6-3 present summaries of cancer risks and HIs, respectively, associated with exposure scenarios under current land use.

The cancer risks associated with exposure to surface soil ingestion, dermal contact, and fugitive dust inhalation under hypothetical future land use are 7×10^{-6} for an aggregate resident (combined adult and child), 4×10^{-7} for an aggregate trespasser (combined adult and adolescent), 8×10^{-7} for an occupational worker, 1×10^{-7} for a site maintenance worker, and 3×10^{-8} for an excavation worker under hypothetical future land use (Table 6-9). Figure 6-4 presents a summary of cancer risk associated with exposure scenarios under future land use. All of these hypothetical future receptor risks are within or below the USEPA acceptable cancer risk range; however, the hypothetical future residential risk exceeds the Florida level of concern of 1×10^{-6} (due to arsenic).

The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation under future land use for all future receptors except child and adult residents are at or below USEPA's target HI of 1 (Table 6-9). The HIs for hypothetical future child and adult residents are 10 and 2, respectively. These HIs exceed the USEPA and FDEP target HI of 1, and are primarily due to TRPH. Figure 6-5 presents a summary of HIs associated with exposure scenarios under future land use.

6.5.2 Subsurface Soil The risk calculations for subsurface soil exposure are shown in Tables C-24 through C-25 in Appendix D to this report. The cancer risks associated with excavation worker exposure to subsurface soil via ingestion, dermal contact, and fugitive dust inhalation, under hypothetical future land use, is 6×10^{-8} (Table 6-9). Figure 6-6 presents a summary of cancer risk associated with exposure scenarios under future land use. The cancer risk is below the USEPA cancer risk range and FDEP target risk level.

The noncancer risk associated with subsurface soil ingestion, dermal contact, and fugitive dust inhalation exposure pathways, under future land use for a hypothetical excavation worker, is below USEPA's and FDEP's target HI of 1. Figure 6-7 presents a summary of HIs associated with exposure scenarios under future land use.

Table 6-8
Risk Summary, Current Land Use

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI*	ELCR*
Current Land Use			
Surface Soil:			
Adult Trespasser:	Incidental ingestion	0.1	2×10^{-7}
	Dermal contact	0.09	1×10^{-8}
	Inhalation of particulates	ND	2×10^{-9}
	Total Adult Trespasser:	0.2	2×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.2	2×10^{-7}
	Dermal contact	0.1	7×10^{-8}
	Inhalation of particulates	ND	9×10^{-10}
	Total Adolescent Trespasser:	0.3	2×10^{-7}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	4×10^{-7}
Site Maintenance Worker:	Incidental ingestion	0.04	9×10^{-8}
	Dermal contact	0.06	1×10^{-8}
	Inhalation of particulates	ND	8×10^{-9}
	Total Site Maintenance Worker:	0.1	1×10^{-7}

Notes: HI = hazard index.

* = totals may not match spreadsheets due to rounding algorithm.

ELCR = excess lifetime cancer risk.

ND = no dose-response data for this exposure route were available for human health chemicals of potential concern in this medium.

NC = not calculated because child and adult HIs are not additive.

Table 6-9
Risk Summary, Future Land Use

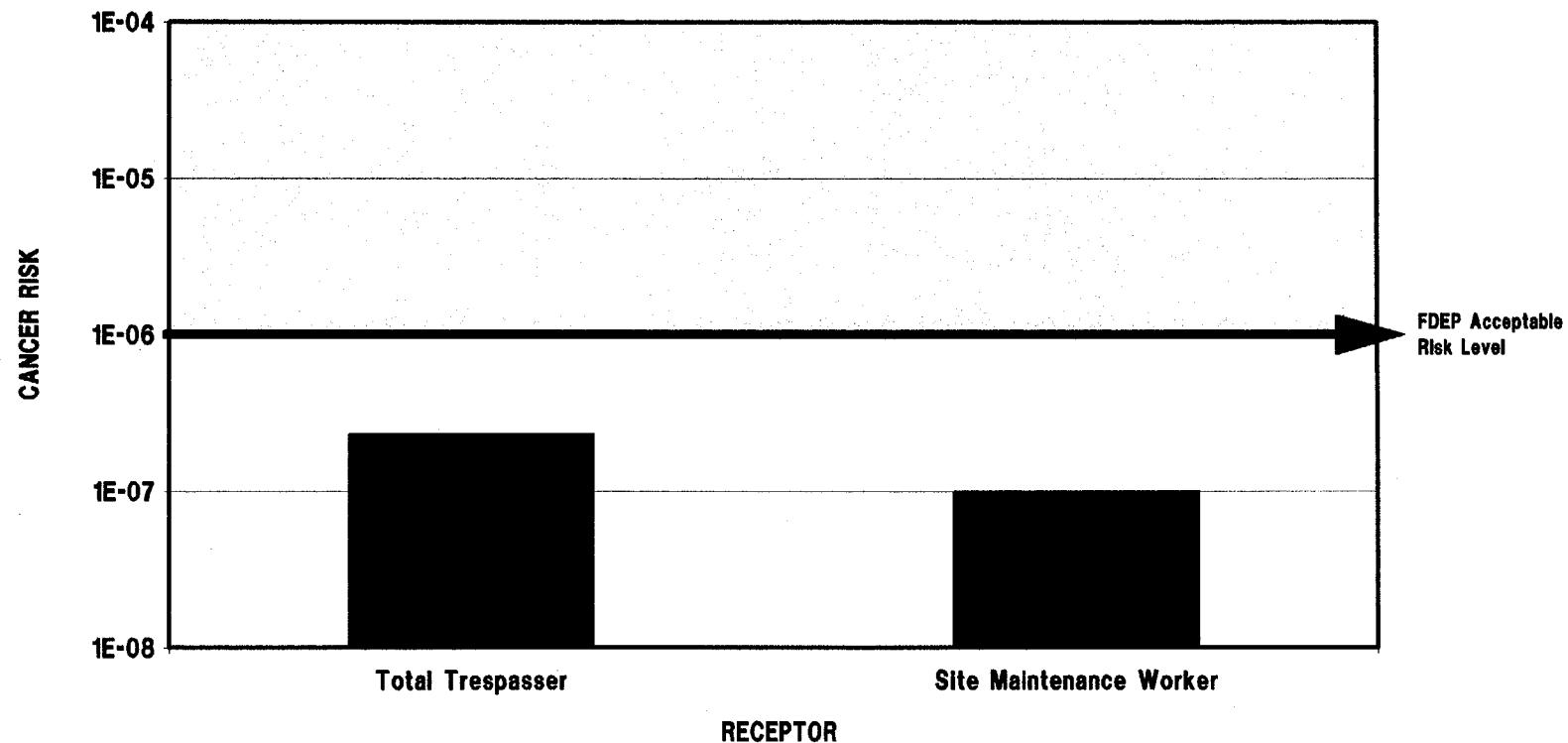
Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI*	ELCR*
Future Land Use			
Surface Soil			
Adult Trespasser:	Incidental ingestion	0.1	2×10^{-7}
	Dermal contact	0.09	1×10^{-8}
	Inhalation of particulates	ND	2×10^{-9}
	Total Adult Trespasser:	0.2	2×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.2	2×10^{-7}
	Dermal contact	0.1	7×10^{-9}
	Inhalation of particulates	ND	9×10^{-10}
	Total Adolescent Trespasser:	0.3	2×10^{-7}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	4×10^{-7}
Adult Resident:	Incidental ingestion	1.0	2×10^{-6}
	Dermal contact	0.7	1×10^{-7}
	Inhalation of particulates	ND	6×10^{-8}
	Total Adult Resident:	2	2×10^{-6}
Child Resident:	Incidental ingestion	9	5×10^{-5}
	Dermal contact	1	4×10^{-6}
	Inhalation of particulates	ND	7×10^{-8}
	Total Child Resident:	10	5×10^{-5}
	Total Risk to Resident (Adult and Child) Exposed to Surface Soil:	NC	7×10^{-6}
Occupational Worker:	Incidental ingestion	0.4	7×10^{-7}
	Dermal contact	0.2	3×10^{-8}
	Inhalation of particulates	ND	2×10^{-9}
	Total Occupational Worker:	0.6	8×10^{-7}
Site Maintenance Worker:	Incidental ingestion	0.04	9×10^{-6}
	Dermal contact	0.06	1×10^{-6}
	Inhalation of particulates	ND	8×10^{-9}
	Total Site Maintenance Worker:	0.1	1×10^{-7}
See notes at end of table.			

Table 6-9 (Continued)
Risk Summary, Future Land Use

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Land Use	Exposure Route	HI *	ELCR *
Future Land Use (Continued)			
Excavation Worker:	Incidental ingestion	0.4	3×10^{-8}
	Dermal contact	0.06	4×10^{-10}
	Inhalation of particulates	ND	3×10^{-10}
	Total Excavation Worker:	0.5	3×10^{-8}
Subsurface Soil			
Excavation Worker:	Incidental ingestion	0.1	6×10^{-8}
	Dermal contact	0.05	8×10^{-10}
	Inhalation of particulates	ND	2×10^{-8}
	Total Excavation Worker:	0.2	6×10^{-8}
Groundwater			
Adult Resident:	Ingestion of groundwater as drinking water	0.2	NE
	Total Adult Resident:	0.2	NE
Child Resident:	Ingestion of groundwater as drinking water	0.5	NE
	Total Child Resident:	0.5	NE
	Total Risk to Resident (Adult and Child) Exposed to Groundwater:	NC	NE
	Total Risk to Resident (Adult and Child) Exposed to Surface Soil, Groundwater:	NC	7×10^{-6}
Notes: HI = hazard index. * = totals may not match spreadsheets due to rounding algorithm. ELCR = excess lifetime cancer risk ND = no dose-response data for this exposure route were available for human health chemicals of potential concern (HHCPCs) in this medium. NC = not calculated because child and adult HIs are not additive. NE = not evaluated; no carcinogenic HHCPC selected.			



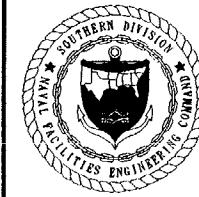
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USEPA acceptable risk range
U.S. Environmental Protection Agency
FDEP
NAS

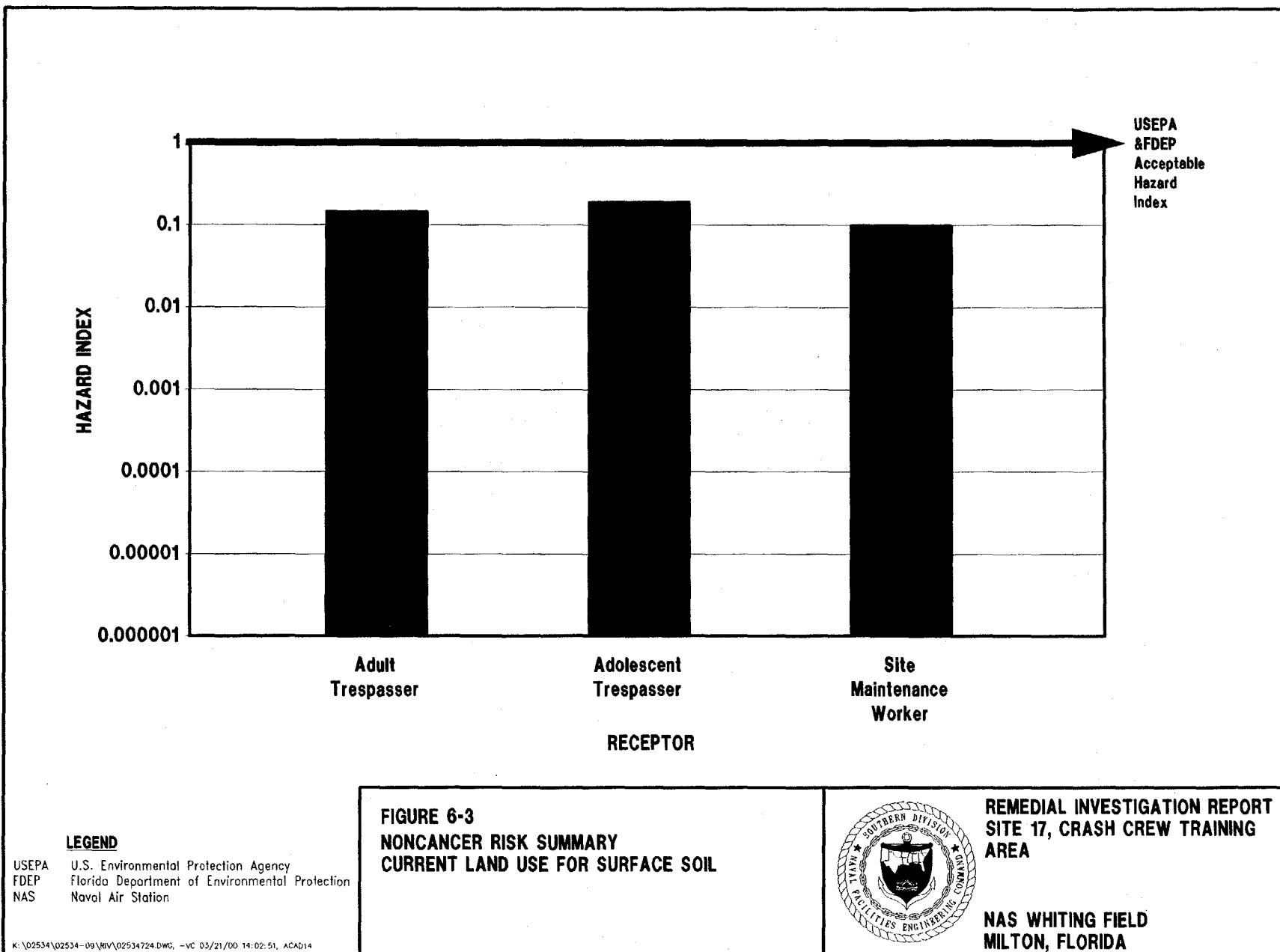
FIGURE 6-2
CANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE SOIL

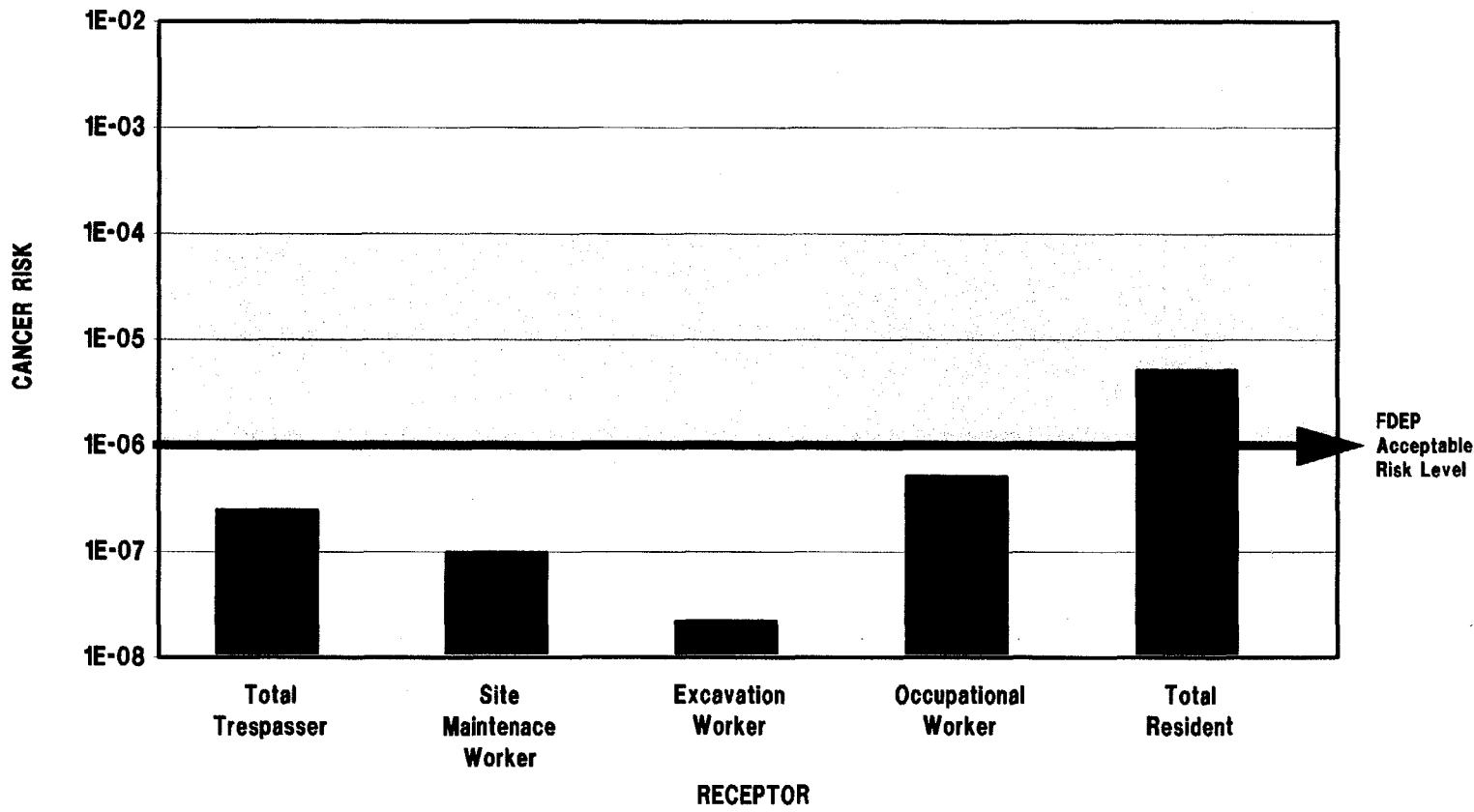
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**REMEDIAL INVESTIGATION REPORT
SITE 17, CRASH CREW TRAINING
AREA**

**NAS WHITING FIELD
MILTON, FLORIDA**

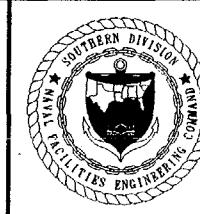




LEGEND

USEPA acceptable risk range
USEPA
FDEP
NAS
U.S. Environmental Protection Agency
Florida Department of Environmental Protection
Naval Air Station

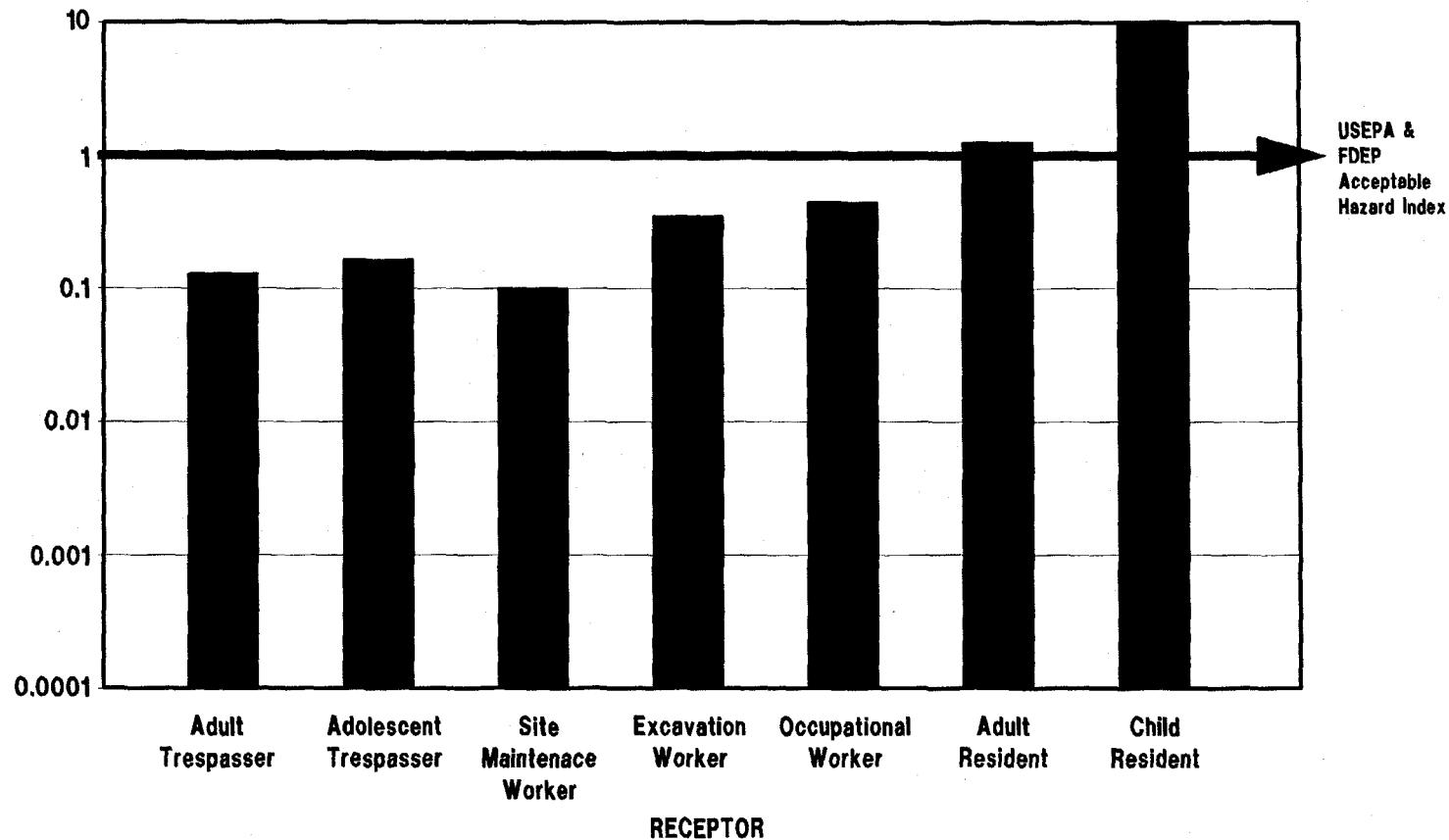
FIGURE 6-4
CANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE SOIL



REMEDIAL INVESTIGATION REPORT
SITE 17, CRASH CREW TRAINING
AREA

NAS WHITING FIELD
MILTON, FLORIDA

HAZARD INDEX



LEGEND

USEPA U.S. Environmental Protection Agency
FDEP Florida Department of Environmental Protection
NAS Naval Air Station

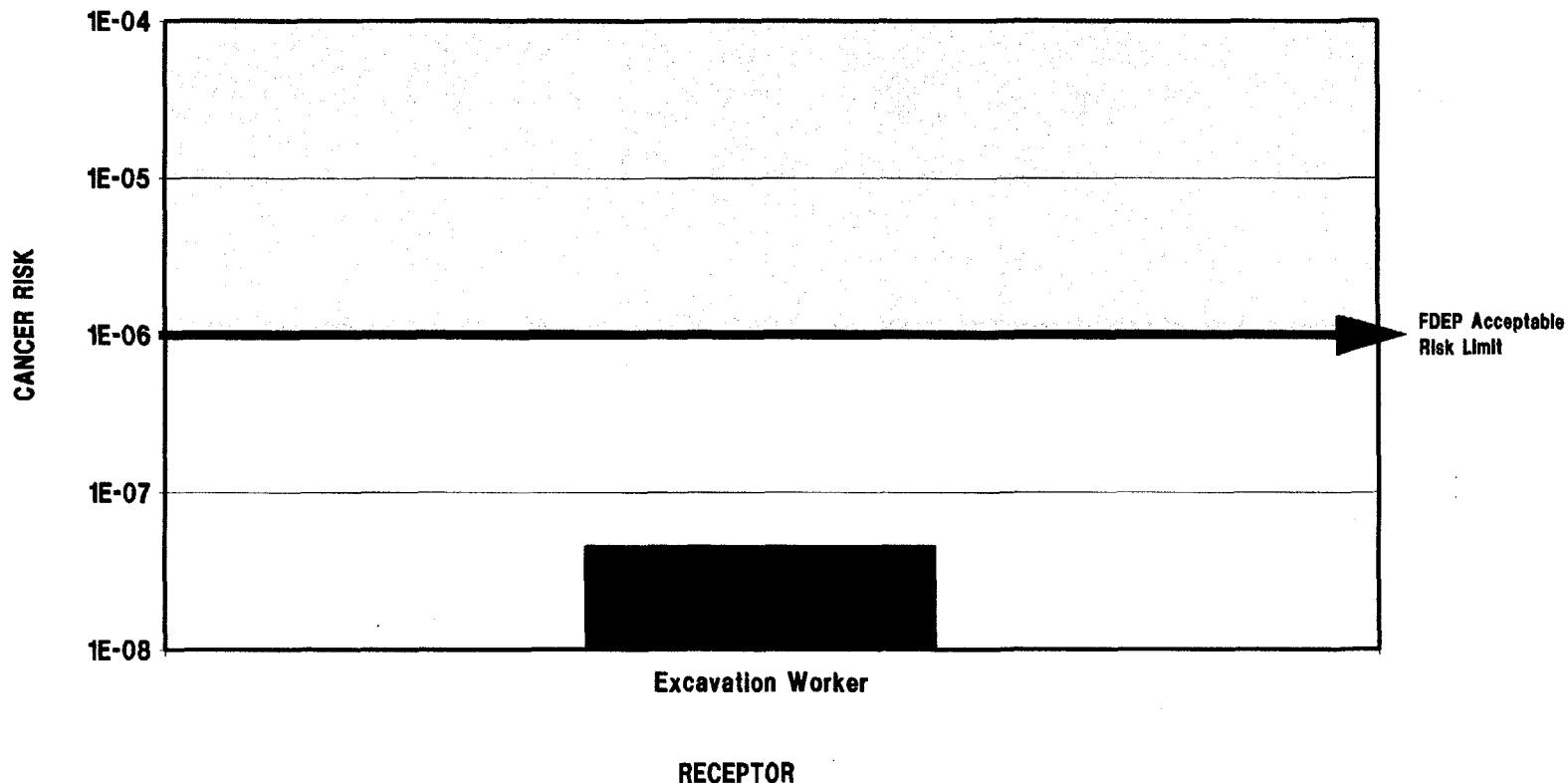
FIGURE 6-5
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE SOIL

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REMEDIAL INVESTIGATION REPORT
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AREA

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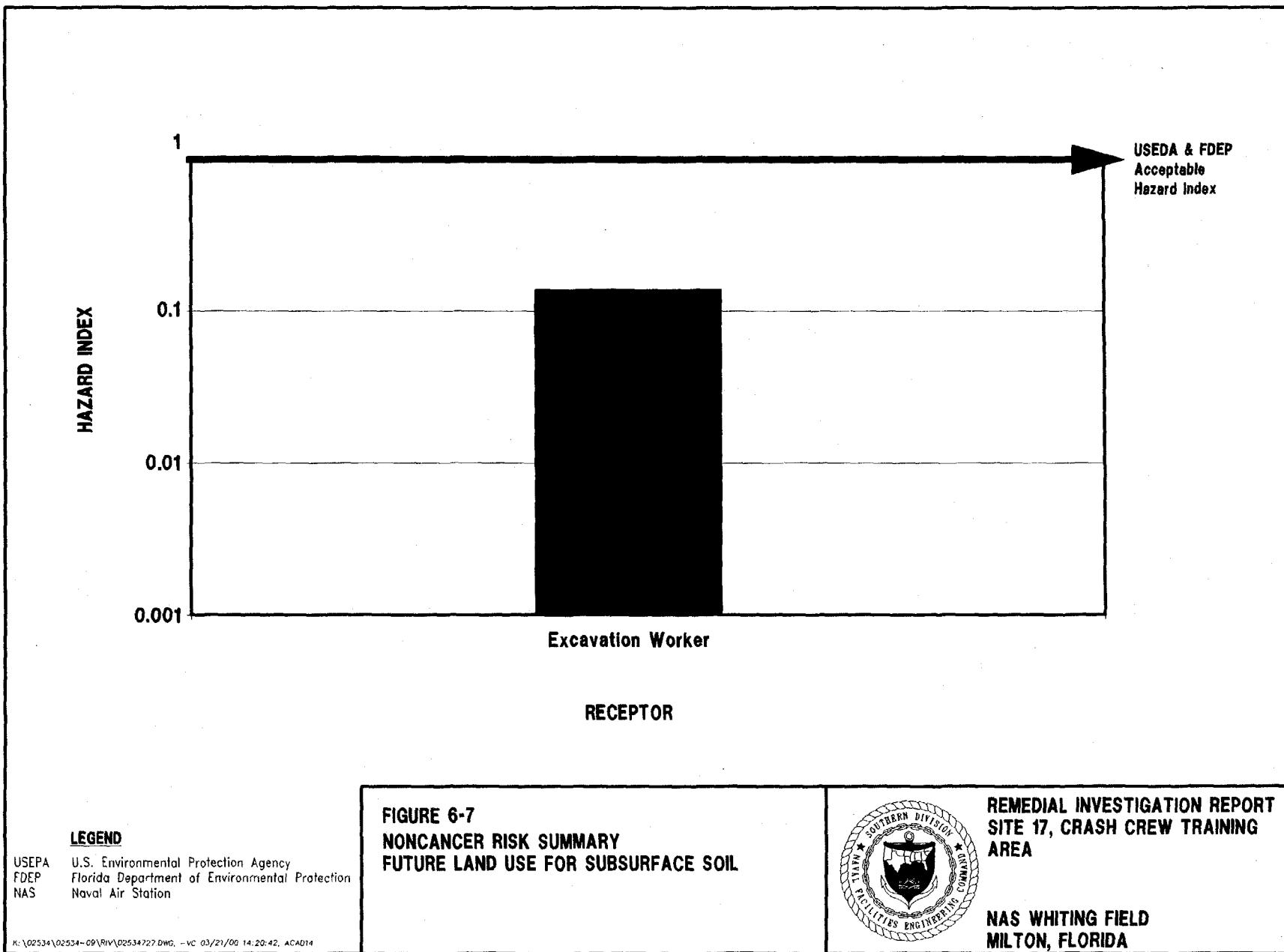
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|--------------------------|--|
| <input type="checkbox"/> | USEPA acceptable risk range |
| USEPA | U.S. Environmental Protection Agency |
| FDEP | Florida Department of Environmental Protection |
| NAS | Naval Air Station |

FIGURE 6-6
CANCER RISK SUMMARY
FUTURE LAND USE FOR SUBSURFACE SOIL



REMEDIAL INVESTIGATION REPORT
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AREA

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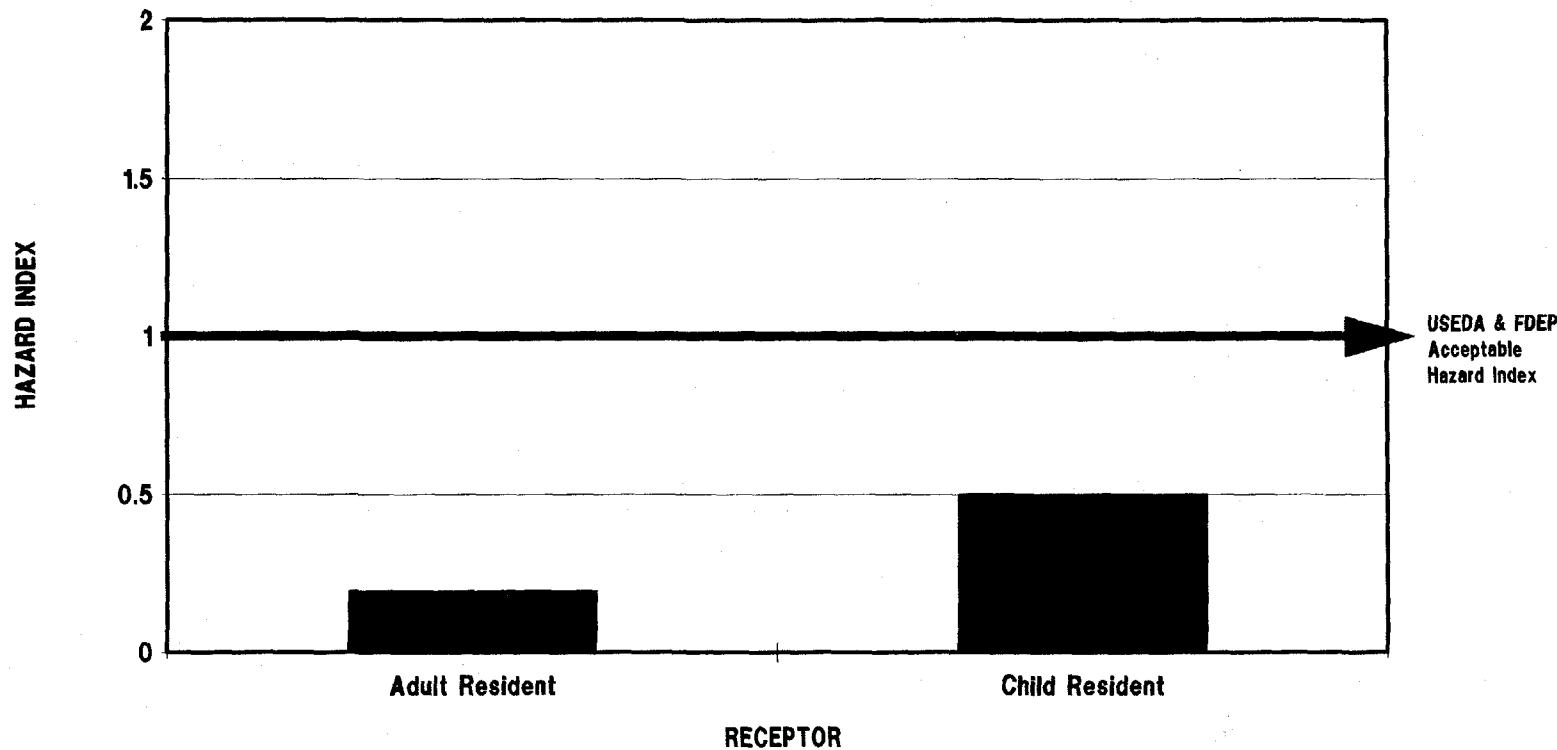
6.5.3 Groundwater The risk calculations for groundwater exposure are shown in Tables C-26 and C-27 in Appendix D to this report. Currently, there are no potable supply wells at the site; thus, there is no human exposure to groundwater. Therefore, risk was not evaluated for the current land-use scenario.

Under hypothetical future residential land use, the noncancer risks associated with groundwater ingestion for the adult and child resident do not exceed the USEPA and FDEP target HI of 1 (Table 6-9). There were no carcinogenic HHCPCs selected at Site 17. Figure 6-8 presents a summary of noncancer risk associated with exposure scenarios under future land use.

6.5.4 Cumulative Risk Summary USEPA Region IV guidance requires an assessment of a cumulative receptor risk (USEPA, 1995a). In this HHRA, the hypothetical future residential receptor could potentially be exposed to surface soil and groundwater. The cumulative cancer risk of 7×10^{-6} is within the USEPA acceptable cancer risk range; however, it exceeds the FDEP target level of concern. This risk is entirely due to surface soil because there were no carcinogenic HHCPCs selected in groundwater at Site 17. The cumulative noncancer risk for a child resident for combined exposure to surface soil and groundwater is an HI of 10; the risk for an adult resident is an HI of 2. These risks are due to TRPH in soil.

6.6 UNCERTAINTY ANALYSIS. General uncertainties associated with the collection, analysis, and evaluation of data; exposure assessment; toxicity assessment; and the risk estimation process are discussed in Paragraph 2.5.5.1 of the GIR (HLA, 1998). Site-specific uncertainties that are important for the interpretation of the calculated risk estimates for surface soil, subsurface soil, and groundwater at Site 17 are discussed below.

- The lack of inhalation RfDs for the HHCPCs in surface soil and subsurface soil may have resulted in underestimates of the HIs associated with exposure to soil at Site 17; however, these noncancer risks are not likely to be significant when compared to oral and dermal exposure risks that are fully characterized.
- The surface soil carcinogenic risks at Site 17 are driven by arsenic. The arsenic in site soil appears to be at naturally occurring levels. The arsenic EPC for surface soil was 2.8 mg/kg, which is below the background screening value of 3.6 mg/kg. This indicates that risks for exposures to arsenic in background (nonsite) soils is actually higher than risk from possible exposure to arsenic in Site 17 soils.
- The SQLs were compared to the risk-based screening criteria and Florida and State regulatory guidelines for all analytes not selected as HHCPCs, to assess whether or not the detection limits were adequate to detect analytes at levels of concern (SQLs of analytes with 100 percent frequency of detection were not evaluated). The analyte with a SQL that exceeded its screening criterion is beryllium in surface soil. Although the SQL exceeded the screening criteria, the detected concentrations were less than the maximum SQL. Because the laboratory equipment were able to detect the SQL, the SQL for beryllium is adequate for this HHRA.



LEGEND
USEPA
FDEP
NAS

U.S. Environmental Protection Agency
Florida Department of Environmental Protection
Naval Air Station

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FIGURE 6-8
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR GROUNDWATER



REMEDIAL INVESTIGATION REPORT
SITE 17, CRASH CREW TRAINING
AREA

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MILTON, FLORIDA

- Some uncertainty is associated with the representativeness of the groundwater data used to complete the risk evaluation at Site 17. Generally, because the low-flow purging and sampling method was used, turbidity in the unfiltered groundwater samples was minimal. However, the analytical results for some of the unfiltered samples may be biased high for inorganic constituents as a result of suspended solids.
- Non-cancer risks for surface soil were primarily driven by TPH; the child and adult resident HIs for potential exposure to all other COPCs in surface soil do not exceed a HI of 1. Because USEPA and FDEP do not publish RfDs for TPH, the RfD for pyrene was selected to provide a conservative assessment of potential risks for exposure to petroleum hydrocarbons. However, the RfD for pyrene is appropriate for evaluating only the most toxic components of petroleum hydrocarbons (USEPA, 1995). The approach used in this risk assessment essentially treats all petroleum hydrocarbons detected at the site as though they are the most toxic forms. Obtaining petroleum hydrocarbon fraction and structure data as recommended in USEPA guidance (USEPA, 1995) would provide for a more accurate estimation of petroleum hydrocarbon toxicity and risk.
- According to the methodology described in the GIR (HLA, 1998) (Paragraph 2.5.3.3), it is appropriate to calculate central tendency risks for hypothetical future receptors that have risks exceeding Florida levels of concern. Because the carcinogenic risk for the hypothetical future resident exceeds the FDEP target of 1×10^{-6} , and the HIs for this receptor exceed the FDEP and USEPA threshold HI of 1, the central tendency risks were evaluated. The central tendency risk results for the hypothetical future residential exposure scenario are presented in Tables D-28 through D-29. The central tendency evaluation involved using the EPCs in Table 6-5 with reasonable but less conservative exposure parameters (USEPA, 1995b).

Only central tendency ingestion and dermal exposures were characterized, because the contribution from the inhalation pathway was insignificant compared to the total risk (see Table 6-9). The central tendency aggregate residential cancer risk for exposure to surface soil is 1×10^{-7} . The HIs for the child and adult residents are 0.5 and 0.05, respectively.

The risk range 1×10^{-7} to 7×10^{-6} presented by the central tendency and reasonable maximum exposure (RME) exposure scenarios for hypothetical future residential receptors, coupled with the knowledge that arsenic, which is the only carcinogenic risk driver in surface soil, has a lower EPC than the background concentration, is useful information to provide perspective for the risk manager and compliance with USEPA guidance (USEPA, 1995c).

- Barium and copper were not carried through the risk assessment due to a lack of RfD values at the time the draft RA was prepared. Recently, the RfD for barium was updated in the IRIS database and the RfD for copper is available in HEAST. These values are 0.07 and 0.04 mg/kg-day, respectively. An assessment was made on the individual contributions on the non-carcinogenic risk. For the child resident, which represents the most sensitive receptor for evaluating non-cancer risks, the HQ due to barium is 0.03 and the HQ due to copper is 0.07. The child resident

HI for surface soil, considering risks for barium and copper, remains at 10. Therefore, including risks for barium and copper does not change the HI or the conclusions of the risk assessment.

6.7 REMEDIAL GOAL OPTIONS. Remedial goal option (RGO) tables are presented for each medium that has total excess lifetime cancer risk (ELCR) greater than 1×10^{-4} or an HI greater than 1 and for media with chemicals whose estimated risk exceeds the Florida target risk level. The RGO concentrations are calculated using the scenario representing the highest estimated risk for a given medium. Based on the above criteria, RGOs are developed for each chemical with a total ELCR greater than 1×10^{-6} or an HQ greater than 0.1. Analytes whose EPCs exceed Florida standards are also presented in the RGO tables.

RGOs and available Federal regulatory and FDEP risk-based criteria are intended to provide the basis for the development of remedial alternatives in the FS. The RGO values are not actual or proposed cleanup levels, but are provided to assist risk-management decision making in the FS.

Table 6-10 presents the RGOs for surface soil at Site 17.

6.8 SUMMARY OF HHRA FOR SITE 17. HHCPCs were identified and risks were estimated for surface soil, subsurface soil, and groundwater associated with Site 17. The following conclusions were drawn based on this HHRA:

- The HHCPCs detected in surface soil do not pose an unacceptable carcinogenic and noncarcinogenic risks to the receptors other than hypothetical future residents based on USEPA and FDEP risk criteria.
- The HHCPCs detected in subsurface soil and groundwater do not pose unacceptable carcinogenic and non-carcinogenic risks to the receptors evaluated based on USEPA and FDEP risk criteria.
- The total ELCR at Site 17, associated with ingestion of soil by a hypothetical future resident, exceeds Florida's target risk level of concern 1×10^{-6} due primarily to arsenic.

The background level of arsenic at the site exceeded the Florida residential SCTL and may result in an unacceptable carcinogenic risk. It is likely that the naturally and/or anthropogenically occurring concentrations of arsenic contribute to the FDEP target risk-level exceedance. Additionally, it is uncertain whether or not the detected concentrations of arsenic are related to past site operations.

- Noncancer risks for hypothetical future resident exposure to surface soil exceed the USEPA and FDEP threshold hazard index of 1, primarily to TRPH.
- The central tendency risks to a hypothetical future resident meet the Florida level of concern (1×10^{-6}). Central tendency and RME residential risks provide the risk managers and decision makers with a perspective of the true hypothetical risk range to future residents.

Table 6-10
Summary of Remedial Goal Options for Surface Soil

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Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (Based on Risk to Resident [adult and child])			Total Hazard Index (Based on Risk to Child Resident)			Florida Soil Cleanup Target Level (Residential) ¹	Florida Soil Cleanup Target Level (Leaching) ¹	Background Screening Concentration
			10 ⁴	10 ⁵	10 ⁶	3	1	0.1			
Inorganic Analytes (mg/kg)											
Aluminum	4,500 to 29,900	17,000	NA	NA	NA	NR	NR	7,390	72,000	SPLP ²	19,580
Arsenic	0.29 to 5.9	2.8	NR	NR	0.43	NR	NR	2.3	0.8	29	3
Iron	2,550 to 23,800	9,510	NA	NA	NA	NR	NR	1,590	23,000	SPLP ²	11,172
TPH	2.3 to 19,300	19,300	NA	NA	NA	6,363	2,120	212	340	340	NA

¹ Values are for residential soil, Chapter 62-777, Florida Administrative Code (FDEP, 1999).

² Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using toxicity characteristic leaching procedure in the event oily wastes are present.

Notes: mg/kg = milligrams per kilograms.

NA = not applicable.

NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.

NSC = no screening concentration available.

7.0 ECOLOGICAL RISK ASSESSMENT

The ERA evaluates potential adverse effects to ecological receptors associated with exposure to chemicals from Site 17, the Crash Crew Training Area, at NAS Whiting Field. Site 17 is located along the northwestern facility boundary, near the North Air Field taxiway. The ERA for Site 17 follows the methodologies described in the NAS Whiting Field General Information Report (GIR) (HLA, 1998), and current guidance materials for ERAs at Superfund sites including the following:

- *Risk Assessment Guidance for Superfund Environmental Evaluation Manual* (USEPA, 1989c)
- *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference* (USEPA, 1989d)
- *Framework for Ecological Risk Assessment* (USEPA, 1992c)
- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997)
- Supplemental Guidance to RAGS: Region 4 Bulletins on Ecological Risk Assessment (USEPA, 1995b)
- *Proposed Guidelines for Ecological Risk Assessment* (USEPA, 1996b)

Additional risk assessment guidance included in the ERA are the USEPA "Eco Update" bulletins (1991c, 1992d, and 1992e) and recent publications (e.g., Maughan, 1993; Suter, 1993).

This ERA was conducted to determine if ecological receptors are potentially exposed to contaminants from Site 17 at concentrations that could cause adverse ecological effects. The Site 17 ERA consists of eight sections.

- Site Characterization (Section 7.1) describes current ecological conditions at the site.
- Problem Formulation (Section 7.2) establishes the goals and focus of the assessment and identifies major factors to be considered.
- Hazard Assessment and Selection of Ecological Chemicals of Potential Concern (Section 7.3) reviews the analytical data and identifies chemicals present at the sites that may pose ecological risks.
- Exposure Assessment (Section 7.4) identifies complete exposure pathways and quantifies the magnitude and frequency of exposure.
- Ecological Effects Assessment (Section 7.5) identifies potential adverse effects to ecological receptors associated with the chemicals of concern identified in Section 7.3.

- Risk Characterization (Section 7.6) integrates exposure and concentration-toxicity response information to derive a likelihood estimate of adverse effects.
- Uncertainty Analysis (Section 7.7) identifies assumptions of the ERA process that may influence the risk assessment conclusions.
- Summary of Ecological Risk (Section 7.8).

7.1 SITE CHARACTERIZATION. Site 17 is located along the northwestern facility boundary, near the North Air Field Taxiway. The site is approximately four acres and consists of multiple shallow depressions where metallic objects were placed to simulate an aircraft after a crash. The site was used from 1951 until 1991. Crash crew training activities consisted of extinguishing approximately 100 gallons of burning AVGAS or jet fuel that was poured into the depressions containing the simulated aircraft. The fires were extinguished using an AFFF (Geraghty and Miller, 1986).

Several shallow depressions are still visible at the site. These depressions are presumably the dug-outs used in the fire training exercises. The presence of hydrophytic vegetation in four of the depressions (Areas F, H, I, and J) indicates that they hold water for an extended period after major rain events. During the 1995 site characterization by HLA, only one depression contained water; presumably even this depression is dry for much of the year. Therefore, the ephemeral depressions are unlikely to provide suitable habitat for aquatic receptors. However, standing water may provide an occasional source of drinking water for small terrestrial animals (amphibians, reptiles, mammals, and birds). Because of the very shallow nature of these depressions, surface water samples were not collected.

Most rainfall infiltrates into the ground at Site 17 because of the sandy soil. However, during heavy rain events, surface water runoff leaves Site 17 via through a culvert on the western side of the site. Overland transport of surface water runoff toward Clear Creek, which is located 2000 feet to the west is possible; however, this pathway is not expected to be a major contaminant transport pathway due to the large travel distance.

Although no aquatic habitat is present at Site 17, groundwater may discharge off site into Clear Creek. Groundwater discharge to surface water is not evaluated as part of the ERA for Site 17 because Clear Creek receives groundwater discharge and storm water runoff from multiple sources of potential contamination at NAS Whiting Field. In addition, detected concentrations of contaminants in Site 17 groundwater are low enough that they are not a concern for current and future discharges to surface water. With the exception of carbon disulfide ($2 \mu\text{g/l}$), which was detected in only one sample, no other organic constituents were detected in groundwater. Also, most of the inorganic constituents were detected at concentrations below the background screening values. Background screening values are equal to twice the average detected inorganic concentration in background samples and are presented in Section 3.3 of the GIR (HLA, 1998).

As shown in the vegetative cover map for Site 17 (Figure 7-1), the site primarily consists of maintained grass (i.e., mowed grass). The regular mowing of the grass

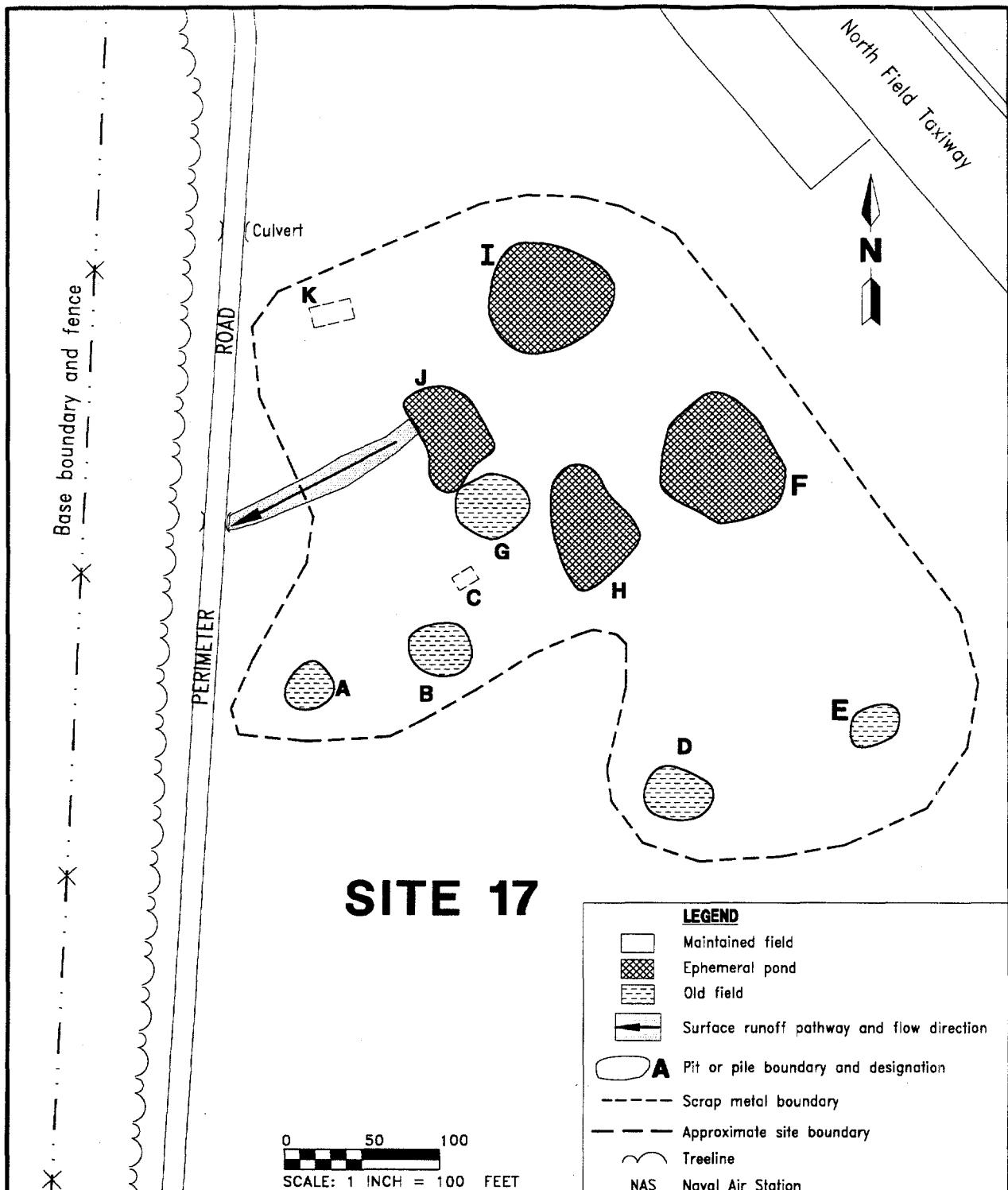


FIGURE 7-1
VEGETATIVE COVER MAP

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at the site prevents ecological succession of vegetative communities; however, the following herbaceous species were observed during the 1995 site characterization: yellow buttons (*Balduina angustifolia*), carex sedge (*Carex sp.*), poor Joe (*Diodia teres*), Ludwigia (*Ludwigia octovalvis*), Mexican clover (*Richardia brasiliensis*), blackberry vine (*Rubus sp.*), blue sage (*Salvia azurea*), willow tree (*Salix nigra*), and red maple (*Acer rubrum*). A complete list of the vegetative species occurring at Site 17 is provided in Appendix G of the GIR (HLA, 1998).

It is likely that the terrestrial plant and invertebrate biomass at Site 17 serves as a forage base for a variety of wildlife species, including adult amphibians, reptiles, small birds, and small mammals. Small reptiles, mammals, and birds may use the forested pine areas located directly west of the site for protection as well as the open areas of Site 17 for foraging or hunting.

Mammals and birds that may occur in the open areas of Site 17 or in the adjacent pine forest include the hispid cotton rat (*Sigmodon hispidus*), cotton mouse (*Peromyscus gossypinus*), short-tailed shrew (*Blarina brevicauda*), American robin (*Turdus migratorius*), and eastern meadowlark (*Sturnella magna*). Predatory mammals and birds such as the red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), great horned owl (*Bubo virginianus*), and the red-tailed hawk (*Buteo jamaicensis*) may also forage in the area of Site 17.

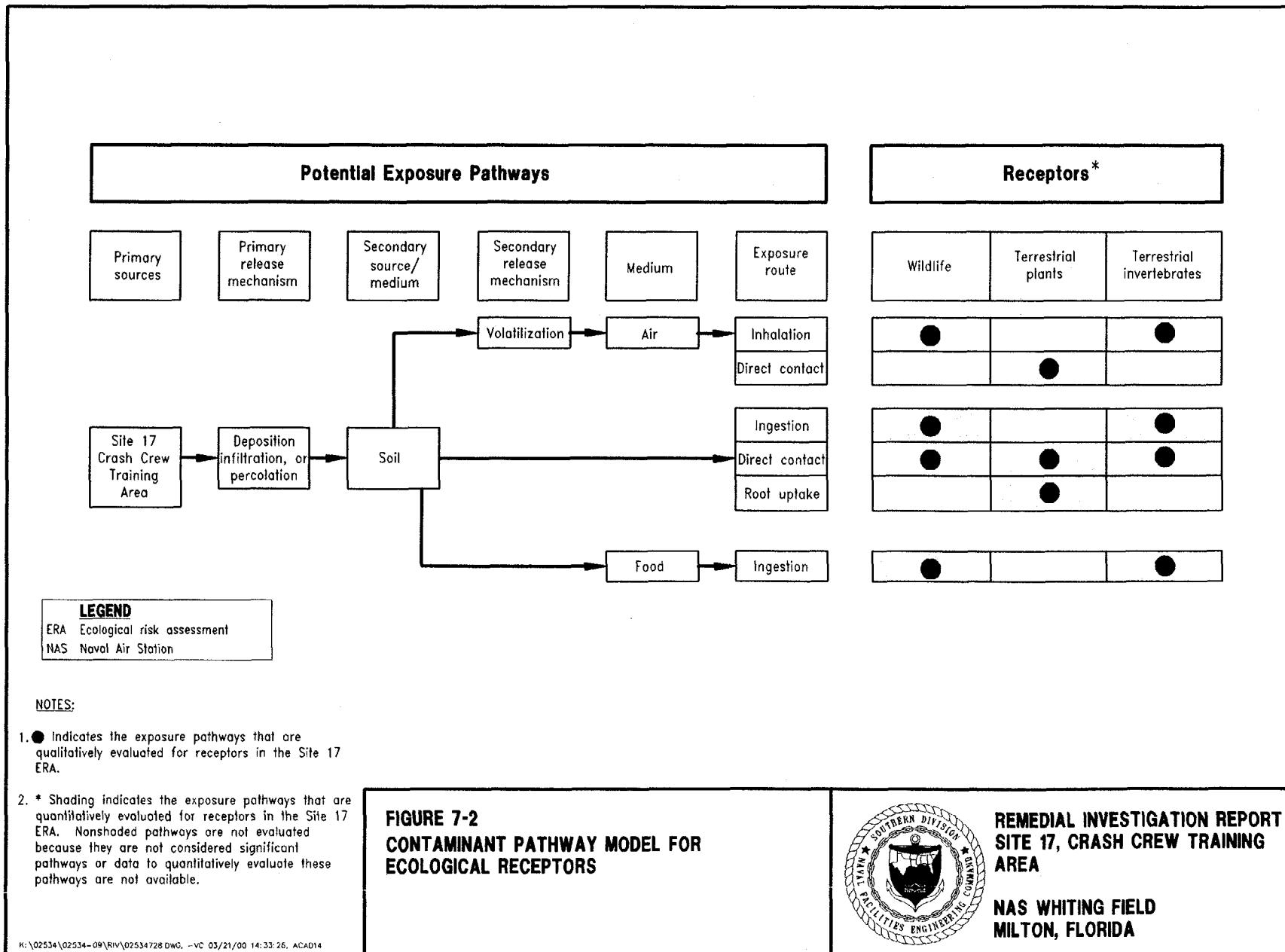
7.2 PROBLEM FORMULATION. The problem formulation is the initial step of the ERA process. Problem formulation consists of identification of receptors, identification of exposure pathways for those receptors, and selection of assessment and measurement endpoints based on information gathered during the site characterization.

7.2.1 Identification of Receptors Ecological receptors that may potentially utilize the available maintained grassy field habitat at Site 17 include terrestrial wildlife (i.e., mammals, birds, reptiles, and adult amphibians), terrestrial plants, and invertebrates. Terrestrial flora and fauna potentially using NAS Whiting Field are identified in the GIR (HLA, 1998). Aquatic receptors are not evaluated in the ERA because the ephemeral ponds are dry most of the year, and the establishment of an aquatic ecosystem is not likely to occur during the short wet periods.

Certain species that potentially reside at NAS Whiting Field are protected by Federal and/or State laws. A list of state and federally protected species is provided in the GIR (HLA, 1998). No state or federally listed rare, threatened, or endangered species or species of concern are known or likely to inhabit Site 17.

7.2.2 Identification of Exposure Pathways Exposure pathways are identified for three groups of receptors (terrestrial wildlife, terrestrial plants, and soil invertebrates). A complete exposure pathway includes a source of contamination, an exposure route, and a receptor. A conceptual model of the exposure pathways from source to ecological receptors is depicted in the contaminant pathway model on Figure 7-2.

All potential routes of exposure are considered in the ERA and are presented in the contaminant pathway model. The model differentiates between those exposure routes that are quantitatively evaluated and those that are qualitatively



discussed. This limitation is necessary to focus the risk evaluation on those pathways with the highest contaminant exposures or are the pathways most likely to occur. Those pathways that cannot be quantitatively evaluated, due to a lack of toxicological information, are qualitatively discussed and addressed as uncertainties. The general approach used to identify exposure pathways for the three groups of receptors is explained below.

Terrestrial Wildlife. Terrestrial wildlife is potentially exposed to contaminants in surface soil and food items contaminated as a result of ingestion, dermal adsorption, and inhalation of fugitive dust and volatile emissions. Because surface water is not present at Site 17, only terrestrial wildlife exposures associated with ingestion of surface soil and potentially contaminated foods are evaluated in the Site 17 ERA.

Dermal adsorption is considered a negligible exposure pathway because the presence of fur, feathers, or chitinous exoskeleton is likely to prevent contamination from coming in direct contact with the skin (personal communication with Ted Simon, USEPA Region 4, September 1997). In addition, soil trapped in the fur or feathers is potentially ingested during grooming or preening activities and is evaluated during the ERA as part of the direct ingestion exposure pathway.

Exposure via inhalation of fugitive dust is also not likely to be a significant exposure pathway because the vegetation at Site 17 would limit the release of fugitive dust. Although volatile constituents were detected in the surface soil of Site 17, exposures associated with VOCs are not evaluated in the ERA because of the low frequency in which they were detected in the surface soil and because no evidence of burrowing animals and/or burrows was noted at Site 17 during the October 1995 biological field investigation conducted by HLA ecologists.

Potential contaminant exposures for reptiles and adult amphibians exist at NAS Whiting Field; however, ingestion toxicity data and bioaccumulation factors (BAFs) are generally not available for these receptors. Therefore, potential risks associated with ingestion of affected surface soil and food items to reptiles and amphibians will be qualitatively addressed in the Uncertainties Analysis (Section 7.7) of the ERA.

Terrestrial Plants and Invertebrates. Terrestrial plants and soil invertebrates may be exposed to contamination in surface soil by direct contact with and root uptake (plants) or ingestion (invertebrates) of soil. The ingestion exposure routes include the ingestion of soil and food items containing chemicals accumulated from Site 17 surface soil. The inhalation exposure route is not evaluated for terrestrial plants and invertebrates due to the reasons discussed above for terrestrial wildlife. Because the depth to groundwater is approximately 105 to 120 feet bbls, well below the root zone of Site 17 plants, it is unlikely that terrestrial plants will be exposed to potential groundwater contamination.

7.2.3 Identification of Endpoints The assessment and measurement endpoints selected for Site 17 ERA are listed in Table 7-1. Assessment endpoints represent the ecological component to be protected, whereas the measurement endpoints approximate or provide a measure of the achievement of the assessment endpoint. One of the assessment endpoints selected for the Site 17 ERA is survival and maintenance of receptor populations and communities at Site 17. The measurement

Table 7-1
Endpoints Selected for Ecological Risk Assessment, Site 17

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Assessment Endpoint	Receptor	Measurement Endpoint	Decision Point
Reduction in the biomass of terrestrial plants to limit the availability of cover or forage material used by small mammals and birds.	Wildlife species	Chemical concentrations (mg/kg) in surface soil that result in adverse effects on growth, reproduction, or survival to terrestrial plants.	The reasonable maximum exposure concentration (mg/kg) of an ECPC in surface soil is greater than the terrestrial plant RTV.
Reduction in the abundance of terrestrial invertebrates to affect foraging by small mammals and birds.	Wildlife species	Chemical concentrations (mg/kg) in surface soil that result in adverse effects on survival (i.e., LC ₅₀ studies) or measured adverse effects on reproduction and growth to terrestrial invertebrates.	The reasonable maximum exposure concentration (mg/kg) in surface soil is greater than the terrestrial invertebrate RTV.
Survival and maintenance of wildlife populations.	Wildlife species	Oral chemical doses (mg/kg BW/day) based on measured adverse effects on growth, reproduction, or survival (i.e., NOAEL, LOAEL, and LD ₅₀ studies) of mammalian and avian laboratory test populations.	Comparison of potential dietary exposures in mammalian and avian wildlife with literature-derived RTVs. HQs > 1 indicate potential risk.

Notes: mg/kg = milligrams per kilogram.

ECPC = ecological chemical of potential concern.

RTV = reference toxicity value.

LC₅₀ = lethal concentration to 50 percent of a test population.

BW/day = body weight per day.

NOAEL = no observed adverse effect level.

LOAEL = lowest observed adverse effect level.

LD₅₀ = lethal dose to 50 percent of a test population.

HQ = hazard quotient.

> = greater than.

endpoints used to gauge the likelihood of terrestrial wildlife population- and community-level effects for Site 17 are chemical-specific toxicological benchmark values. These benchmark values are obtained from the literature and are based on laboratory-measured survival, growth, and reproductive effects. For terrestrial plants and invertebrates at Site 17, the measurement endpoints are benchmark values derived from the literature.

Three hypotheses were developed to gauge potential risks associated with exposure to Site 17 surface soil. These hypotheses are designed for multiple species and trophic levels and represent both individual and community dynamics. Hypotheses for the Site 17 ERA are listed below.

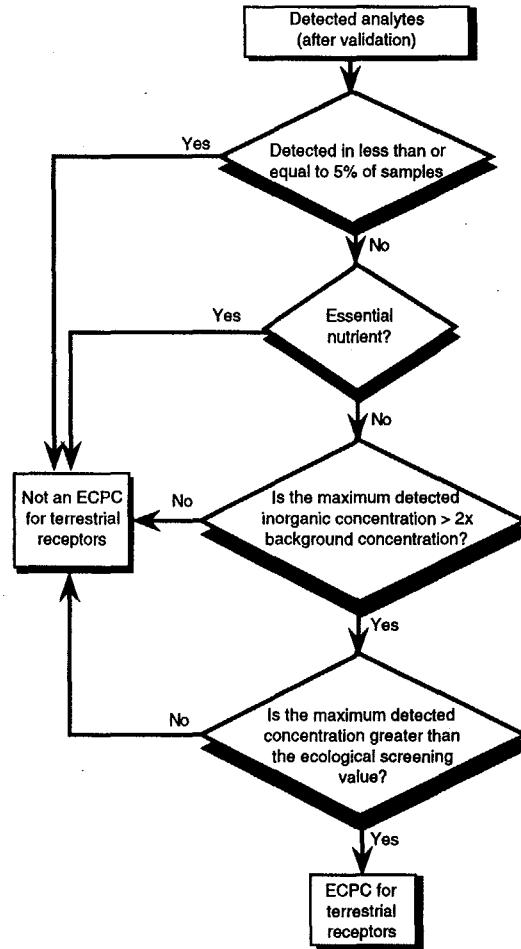
1. ECPCs present in the surface soil are not at concentrations sufficiently high enough to reduce plant or soil invertebrate biomass or plant cover availability such that small mammal and bird populations would be affected.
2. ECPC concentrations in plants and invertebrates are not sufficiently high enough to adversely affect foraging by small mammal or bird populations following consumption of contaminated prey.
3. Bioaccumulating chemicals are not present at concentrations sufficiently high enough to reduce survivability, growth, or reproduction in top predators (i.e., foxes and owls).

7.3 HAZARD ASSESSMENT AND SELECTION OF ECPCs. The hazard assessment includes a review of analytical data and selection of ecological chemicals of potential concern (ECPCs). ECPCs represent analytes detected in environmental media (i.e., surface soil) that are considered in the ERA and could present a potential risk for ecological receptors. The process for selecting ECPCs is depicted on Figure 7-3. Additional details regarding the ECPC selection process are provided in Subsection 2.4.2 of the GIR (HLA, 1998). Analytical data for Site 17 were evaluated for use in risk assessment pursuant to national guidance, *Guidance for Data Useability in Risk Assessment (Parts A and B)* (USEPA, 1992a).

Calcium, iron, magnesium, potassium, and sodium were excluded as ECPCs for surface soil. These analytes are considered essential nutrients and not toxic. The rationale for eliminating essential nutrients as ECPCs is provided in the GIR (HLA, 1998).

Inorganic chemicals representative of background conditions are not selected as ECPCs. In accordance with USEPA Region IV guidance (USEPA, 1991a), an inorganic analyte is not selected as an ECPC if the maximum detected concentration is less than twice the average detected inorganic concentration in background samples. Background screening consists of comparing the maximum detected concentration for each analyte detected at the site against a representative site-specific background surface soil concentration (twice the average background concentration).

A site-specific background investigation of surface soil was conducted at NAS Whiting Field, and the findings are presented in Subsection 3.3.1 of the GIR (HLA, 1998). The site-specific background study used to establish background screening values for Site 17 surface soil consists of eleven surface soil samples (BKG-SL-02 through BKG-SL-08, BKS00101, BKS00201, BKS00401, and BKS00501) and one



NOTES:

ECPC = ecological contaminant of potential concern

> = greater than

x = times

% = percent

Terrestrial receptors include wildlife, plants, and soil invertebrates.

FIGURE 7-3
ECOLOGICAL CHEMICAL OF POTENTIAL CONCERN SELECTION PROCESS

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duplicate sample (BKS00201D) collected from Troup soil type, which is considered most geologically similar to the soil from Site 17.

Analytes that exceed background screening concentrations and are not essential nutrients are also screened against ecological screening value for surface soil. The surface soil ecological screening values used in the ERA are the Dutch Soil Criteria "A," which refer to background concentrations in surface soil issued by the U.S. Fish and Wildlife Service (Beyer, 1990). If the maximum detected concentration of an analyte exceeds the surface soil ecological screening value, the analyte is retained as an ECPC for terrestrial wildlife, terrestrial plants, and soil invertebrates.

Table 7-2 presents a summary of the respective surface soil analytical data for Site 17 and includes the following information: frequency of detections, range of detection limits, range of detected concentrations, average of detected concentrations, background screening concentrations, and ecological screening values. For those analytes that are retained as ECPCs in the ERA, the following information is also provided: average of all concentrations, 95th percent UCL, and RME and central tendency (CT) EPCs. A discussion of how EPCs are determined is provided in Subsection 7.4.1.

Thirty-four surface soil samples (17-SL-01 through 17-SL-34 with duplicates at 17-SL-11A, 7-SL-17A, and 17-SL-21) were collected at Site 17. Surface soil samples were analyzed for VOCs, SVOCs, pesticides and PCBs, inorganics analytes, and TRPH.

As shown in Table 7-2, ECPCs selected for the surface soil samples collected at Site 17 include seven VOCs (2-butanone, carbon disulfide, ethylbenzene, methylene chloride, toluene, trichloroethene, and xylene), four SVOCs (2-methylnaphthalene, butylbenzylphthalate, naphthalene, and bis[2-ethylhexyl]phthalate), six inorganic analytes (aluminum, antimony, cadmium, copper, lead, and vanadium), and TRPH.

7.4 EXPOSURE ASSESSMENT. The purpose of the ecological exposure assessment is to estimate or measure the amount of an ECPC to which an ecological receptor may be exposed. The following sections briefly describe how contaminant exposures are estimated or measured for wildlife, terrestrial plants, and invertebrates at Site 17. The contaminant pathway model (Figure 7-2) provides a summary of the potential exposure pathways that exist at Site 17 for each group of receptors. Additional details regarding the exposure assessment are provided in the GIR (HLA, 1998).

7.4.1 Calculation of EPCs The EPC is a representative concentration used for evaluating risks throughout this ERA. RME and CT concentrations are derived for each ECPC. Because the sample size for the surface soil data set is greater than ten, the RME value is equal to the lesser of the maximum detected concentration and the 95th percent UCL calculated on the log-transformed arithmetic mean (USEPA, 1992c). For a sample having no reported analyte concentration, one-half of the detection limit is used as a surrogate concentration to calculate the 95th percent UCL. If potential risks are predicted based on the RME scenario, then the CT exposure scenario is also evaluated. The CT exposure concentration is represented by the arithmetic mean of all samples.

Table 7-2
Selection of Ecological Chemicals of Potential Concern
for Surface Soil Associated with Site 17

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Analyte	Frequency of Detection ¹	Reporting Limit Range	Detected Concentration Range ²	Average of Detected Concentrations ³	Background Screening Concentration ⁴	Ecological Screening Value ⁵	Chemical of Ecological Concern	95% UCL ⁶	Average of All Samples ⁷	Exposure Point Concentration	
										RME ⁸	CT ⁹
Volatile Organic Compounds (µg/kg)											
2-Butanone	3/34	11 to 8,250	6 to 80	47	ND	NSC	Yes	464	285	80	80
Carbon disulfide	14/34	5 to 4,015	1 to 26	4.3	ND	NSC	Yes	262	139	26	26
Ethylbenzene	6/34	5 to 4,015	2 to 14,000	3,886	ND	50	Yes	765	710	765	710
Methylene chloride	2/34	6 to 4,015	69 to 130	99.5	ND	NSC	Yes	257	155	130	130
Toluene	4/34	5 to 4,015	1 to 23,000	5,760	ND	50	Yes	567	772	567	567
Trichloroethene	2/34	5 to 4,015	2 to 160	81	ND	1	Yes	162	133	160	133
Xylenes (total)	20/34	5 to 4,015	1 to 130,000	9,735	ND	50	Yes	14,472	5,739	14,472	5,739
Semivolatile Organic Compounds (µg/kg)											
2-Methylnaphthalene	5/34	360 to 9,900	190 to 4,900	2,578	ND	¹⁰ 100	Yes	1,274	892	1,274	892
Butylbenzylphthalate	3/34	360 to 9,900	360 to 490	423	ND	NSC	Yes	837	658	490	490
Naphthalene	6/34	360 to 9,900	81 to 7,200	1,959	ND	100	Yes	963	773	963	773
bis(2-Ethylhexyl) phthalate	7/34	360 to 9,900	49 to 800*	351	80.3	NSC	Yes	773	595	773	595
Inorganic Analytes (mg/kg)											
Aluminum	34/34	40	4,500 to 29,900	13,710	19,580	50	Yes	16,984	13,710	16,984	13,710
Antimony	3/34	2.7 to 12	3.3 to 10.3	5.9	8	3.5	Yes	2	1.9	2	1.9
Arsenic	33/34	1.55 to 2	0.29 to 5.9	2.2	3.6	10	No ¹¹				
Barium	34/34	40	3.6 to 145	28.8	30	165	No ¹¹				
Beryllium	25/34	0.05 to 1	0.055* to 0.22	0.12	0.38	1.1	No ^{11,12}				
Cadmium	15/34	0.59 to 1	0.76 to 26.5*	5.2	0.58	1.6	Yes	3.7	2.5	3.7	2.5
Calcium	32/34	343.5 to 1,000	94.9 to 780	258	1,108	NSC	No ^{12,13}				
Chromium	34/34	2	4 to 82.1	20	14	0.4	Yes	48.7	20	48.7	20

See notes at end of table.

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern
for Surface Soil Associated with Site 17

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Analyte	Frequency of Detection ¹	Reporting Limit Range	Detected Concentration Range ²	Average of Detected Concentrations ³	Background Screening Concentration ⁴	Ecological Screening Value ⁵	Chemical of Ecological Concern	95% UCL ⁶	Average of All Samples ⁷	Exposure Point Concentration	
										RME ⁸	CT ⁸
Inorganic Analytes (mg/kg) (Continued)											
Cobalt	30/34	0.37 to 10	0.59 to 2.4	1.4	3.4	20	No ^{11,12}				
Copper	34/34	5	2.4 to 218	34.6	9.6	40	Yes	50.4	34.6	50.4	34.6
Iron	34/34	2 to 20	2,550 to 23,800	7,737	11,172	200	No ¹³				
Lead	34/34	1	3 to 207	46.2	11.8	50	Yes	85.6	46.2	85.6	46.2
Magnesium	34/34	1,000	59.1 to 502*	185	548	NSC	No ^{12,13}				
Manganese	34/34	3	5.1 to 198	56.5	632	100	No ¹²				
Nickel	23/34	2.3 to 8	2* to 11.6*	4.4	7.2	30	No ¹¹				
Potassium	25/34	131 to 1,000	153 to 1,350	432	250	NSC	No ¹³				
Silver	6/34	0.32 to 2	0.355* to 0.53	0.45	0.78	2.0	No ^{11,12}				
Sodium	32/34	198 to 1,000	133 to 279	191	376	NSC	No ^{12,13}				
Vanadium	34/34	10	6.4 to 71.3	20.3	28	2.0	Yes	25	20.3	25	20.3
Zinc	34/34	4	7.2 to 179	37	17	50	Yes	99.6	37	99.6	37
Total Petroleum Recoverable Hydrocarbons (TRPH) (mg/kg)											
TRPH	30/34	1.8 to 2	2.3 to 19,300	3,094	ND	NSC	Yes	1,528,810	2,730	19,300	2,730

¹ Frequency of detection is the number of samples in which the analyte was detected in relation to the total number of samples analyzed (excluding rejected values).

² The value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect value, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the sample where a nondetection was reported.

³ The average of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.

⁴ The background screening value is twice the average of detected concentrations for inorganic analytes in background samples. Organic analyte values are one times the average of detected concentrations. Organic values are included for comparison purposes only (i.e., not used to select ECPCs).

⁵ The ecological screening values are from the Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment (USEPA, 1998b).

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern
for Surface Soil Associated with Site 17

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Notes continued from previous page.

⁸ The 95th percent UCL is calculated on the log-transformed average of all samples using the formula provided in the USEPA *Supplemental Guidance to RAGS: Calculating the Concentration Term*. (USEPA, 1992b).

⁹ The average of all samples assigns a value of one-half of the contract-required quantification limit/contract-required detection limit as a surrogate concentration for samples where a nondetect was reported.

¹⁰ The RME exposure point concentration (EPC) is equal to the lesser of the maximum detected concentration or the 95 percent UCL.

¹¹ The CT concentration is equal to the lesser of the average of all samples or the maximum EPC.

¹² Ecological screening value for this polynuclear aromatic hydrocarbon is not available; the ecological screening value for naphthalene is used as a surrogate.

¹³ The maximum detected concentration is less than the ecological screening concentration. Therefore, the analyte will not be evaluated further.

¹⁴ The maximum detected concentration is less than the background screening concentration. Therefore, the analyte will not be evaluated further.

¹⁵ Analyte is an essential nutrient and is not considered toxic. Therefore, the analyte will not be evaluated further.

Notes: Samples: 17-SL-01, 17-SL-02, 17-SL-03, 17-SL-04, 17-SL-05, 17-SL-06, 17-SL-07, 17-SL-08, 17-SL-09, 17-SL-10, 17-SL-11, 17-SL-12, 17-SL-13, 17-SL-14, 17-SL-15, 17-SL-16, 17-SL-17, 17-SL-18, 17-SL-19, 17-SL-20, 17-SL-21, 17-SL-22, 17-SL-23, 17-SL-24, 17-SL-25, 17-SL-26, 17-SL-27, 17-SL-28, 17-SL-29, 17-SL-30, 17-SL-31, 17-SL-32, 17-SL-33, and 17-SL-34,

Duplicate sample: 17-SL-11A, 17-SL-17A, and 17-SL-21A.

Background samples: BKG-SL-02, BKG-SL-03, BKG-SL-04, BKG-SL-05, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and BKS00501.

Background duplicate sample: BKS00201D.

% = percent.

UCL = upper confidence level.

RME = reasonable maximum exposure.

CT = central tendency.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

ND = not detected in any background sample.

NSC = no screening concentration available.

* = average of a sample and its duplicate.

mg/kg = milligrams per kilogram.

One-half of the detection limit is used as a surrogate value for a sample with an analytical result that is below the detection limit. Table 7-2 presents the RME and CT EPCs for selected surface soil ECPCs.

7.4.2 Terrestrial Wildlife Exposure routes for wildlife receptors include direct and indirect ingestion of soil and ingestion of food items containing site-related chemicals. The actual amount of an ECPC taken in by wildlife species (i.e., ingestion dose in milligrams per kilogram per day) depends on a number of factors. A potential dietary exposure (PDE) model is used to estimate exposure to representative wildlife species. The PDE (or body dose) is calculated for each ECPC in surface soil using the equations presented in Table 7-3 and the methodologies described in the GIR (HLA, 1998).

Wildlife species from different trophic guilds that may be present at Site 17 were selected for the PDE model. The model uses species-specific feeding and habitat characteristics to estimate chemical exposures to wildlife species respective to their position in the food chain. Terrestrial receptors were chosen to represent the trophic levels typically found in the open maintained fields at Site 17. The representative wildlife species considered in the ERA are summarized in Table 7-4 and discussed below.

- **Cotton mouse (*Peromyscus gossypinus*)**. The cotton mouse represents a small mammalian herbivore that could potentially be exposed to contamination in soil and in plant tissue (accumulated from the soil). The cotton mouse home range is estimated at 0.147 acres. The cotton mouse represents the small mammal herbivore community at Site 17.
- **Short-tailed shrew (*Blarina brevicauda*)**. The short-tailed shrew finds suitable habitat in forests, fields, marshes, and brush. It primarily feeds on earthworms, snails, centipedes, insects, small vertebrates, and slugs (DeGraaf and Rudis, 1986). Insectivorous species may receive relatively high chemical doses of bioaccumulating compounds because of their voracious appetites. The home range for the short-tailed shrew is estimated at 0.96, plus or minus 0.02 acres. The shrew represents the small omnivorous mammals that may be found in the open fields of Site 17.
- **Mourning dove (*Zenaida macroura*)**. The mourning dove forages by ground-gleaning in railroad right-of-ways, roadsides, and open fields with scattered shrubs and trees. It feeds almost entirely on seeds, with an occasional insect or snail. Gravel is sometimes ingested to facilitate seed digestion (Terres, 1980). The mourning dove will nest in a variety of man-made or natural structures and has an estimated home range of 5 acres. The dove represents herbivorous avian receptors at Site 17.
- **Eastern meadowlark (*Sturnella magna*)**. The eastern meadowlark is most commonly found in open pastures, prairies, farms, and meadows and has a home range of approximately 5 acres. The meadowlark feeds primarily on invertebrates, although its diet is supplemented with plants. The meadowlark represents insectivorous avian receptors found in the open areas of Site 17.
- **Red Fox (*Vulpes vulpes*)**. This omnivorous mammal prefers open woodlands and grassy fields and is most active at night and twilight. It is an opportunistic forager, feeding on small mammals, birds, amphibians, reptiles, invertebrates, berries, and other fruits (Burt and Grossenheider, 1976).

Table 7-3
Estimation of Potential Chemical
Exposures for Representative Wildlife Species

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Estimation of Chemical Exposures Related to Surface Soil

Scope: Estimates the amount (dose) of a chemical ingested and accumulated by a species via incidental ingestion of surface soil and food items containing site-related chemicals.

Soil Chemical Concentration: The lesser of the maximum detected concentration or the 95th percent upper confidence limit (UCL) of the mean is used when the sample size is ≥ 10 .

**Soil
Exposure
Concentration:**

$$\text{Soil Exposure} = \left(\frac{\% \text{ of Diet as Soil}}{\text{mg/kg}} \times \frac{\text{Concentration}}{\text{mg/kg}} \right)$$

Primary Prey Item Concentration (T^1)

$$\frac{\text{Primary Prey Item Concentration}}{\text{(mg/kg)}} = \left(\frac{\text{BAF}_{\text{inv or plant}}}{\text{(mg/kg)}} \times \frac{\text{Soil Concentration}}{\text{(mg/kg)}} \right)$$

Secondary Prey Item
Concentration (T^2):

$$\text{Secondary Prey Item Concentration (mg/kg)} = (\text{BAF}_{\text{mam or bird}} \times \text{Tissue Concentration of Primary Prey Items}^* (\text{mg/kg}))$$

where: BAF =

bioaccumulation factor (mg/kg fresh weight tissue over mg/kg dry weight soil for invertebrates and plants, and mg/kg fresh weight tissue over mg/kg fresh weight food for small mammals and small birds). For a discussion of the weighted chemical concentration in prey items, see the explanation of the potential dietary exposure term below and in the GIR (Harding Lawson Associates, 1998).

* for a discussion of the weighted chemical concentration in prey items, see explanation of the PDE term below, and the General Information Report (ABB-ES, 1998).

See notes at end of table.

Table 7-3 (Continued)
Estimation of Potential Chemical
Exposures for Representative Wildlife Species

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Total
 Exposure
 Related to
 Surface Soil:

$$PDE = \frac{[P_1 \times T_1 + \dots + P_N \times T_N + \frac{\text{soil exposure}}{BW}] \times IR_{Diet} \times SFF \times ED}{BW}$$

where: PDE = potential dietary exposure (mg/kgBW-day),
 P_N = percent of diet composed of food item N,
 T_N = tissue concentration in food item N (mg/kg),
 IR_{Diet} = food ingestion rate of receptor (kg of food or dietary items per day),
 BW = body weight (kg) of receptor,
 SFF = site foraging frequency (site area [acres] divided by the receptor's home range [acres]), SFF can not exceed 1, and
 ED = exposure duration (fraction of year species is expected to occur onsite).

¹ Primary prey contain site-related chemicals in their tissues as a result of direct ingestion of contaminated media (i.e., plants, earthworms, etc.)

² Secondary prey contain site-related chemicals as a result of ingestion of primary prey food items. Secondary prey do not directly consume contaminated media as a food source.

Notes: \geq = greater than or equal to.

% = percent.

mg/kg = milligrams per kilogram.

BAF = bioaccumulation factor.

inv = invertebrate species.

mam = mammal species.

mg/kg BW-day = milligrams per kilogram of body weight per day.

kg = kilograms.

Table 7-4
Ecological Receptors Evaluated For Surface Soil

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Receptor Evaluated		Method of Evaluation
Common Name	Scientific Name	
Terrestrial plants	NA	Benchmark comparison
Terrestrial invertebrates	NA	Benchmark comparison
Representative Wildlife Species		
Cotton mouse	<i>Peromyscus gossypinus</i>	Food-web model
Short-tailed shrew	<i>Blarina brevicauda</i>	Food-web model
Mourning dove	<i>Zenaida macroura</i>	Food-web model
Eastern meadowlark	<i>Sturnella magna</i>	Food-web model
Red fox	<i>Vulpes vulpes</i>	Food-web model
Red-tailed hawk	<i>Buteo jamaicensis</i>	Food-web model

Note: NA = not applicable.

The red fox has an estimated home range of approximately 250 acres and represents the large predatory mammal guild at Site 17.

- **Red-tailed Hawk (*Buteo jamaicensis*)**. The red-tailed hawk forages in open country, particularly if woodland edges are present. It consumes primarily small mammals, but its diet may also include invertebrates, reptiles, and small birds. Red-tailed hawks are year-round residents in the Southeast and have a home range of approximately 800 acres. Red-tailed hawks are frequently seen perched adjacent to open fields (DeGraaf and Rudis, 1986). The hawk may reside in the forested areas adjacent to Site 17 and feed on species that have been exposed to surface soil ECPCs at Site 17.

Parameters for quantitatively evaluating exposures to wildlife include body weight, food ingestion rates, home range, and relative consumption of food items. Exposure assumptions for each of the representative wildlife species for Site 17 are provided in Table 7-5 and Tables E-6 in Appendix E. In addition to these parameters, the species foraging habits and bioaccumulation of ECPCs in food items are also considered.

The site foraging frequency (SFF) is an adjustment term that accounts for the frequency a receptor feeds within the site area. The SFF is based on the site area (reported in acres) relative to the receptor's home range, multiplied by the fraction of the year the receptor would be exposed to site-related chemicals (i.e., the exposure duration). By definition the SFF cannot exceed 1. Because all representative wildlife species are expected to actively forage at the site year round, it is assumed that the exposure durations for these organisms are 1.

BAFs are used in the wildlife exposure model to estimate the transfer of chemicals between soil and plants or soil invertebrates, and between these organisms and primary consumer species. To estimate the PDE, tissue concentrations of ECPCs in prey items are estimated using BAFs for surface soil. BAFs for most receptors are extrapolated from literature values or estimated using regression equations from scientific literature. Based on the evidence provided in several reference materials (Suter, 1993; Maughan, 1993), the ERA assumes that VOCs do not bioaccumulate in prey tissue. The general approach used to select BAFs for Site 17 is summarized in Table 7-6.

BAFs for invertebrate and plant food items are defined as the ratio of the ECPC concentration in plant or invertebrate tissue (mg chemical/kg tissue wet-weight) to the ECPC concentration in surface soil (mg chemical/kg dry-weight soil). BAFs reported in the scientific literature for avian and mammalian receptors are the reported ratios of ECPC concentrations in the tissues of these receptors (mg chemical/kg tissue wet-weight) to the concentrations of ECPCs in their food items (mg chemical/kg tissue wet-weight). With the exception of cadmium, BAFs for avian species were not available. BAFs for each ECPCs evaluated at Site 17 are included in Table E-1 in Appendix E.

7.4.3 Terrestrial Plants and Invertebrates Terrestrial plants and invertebrates may be exposed to ECPCs via direct contact with and root uptake (plants) or ingestion (invertebrates) of ECPCs measured in Site 17 surface soil. The Site 17 ERA assumes that exposures to terrestrial plants and invertebrates occur within the top one foot interval of surface soil. Exposure of terrestrial plants to groundwater is not evaluated because the depth to the water table is approximately

Table 7-5
Exposure Parameters for Representative
Wildlife Species Selected for Site 17

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Representative Wildlife Species	Body Weight (kg)	Reported Diet	Assumed Diet for Terrestrial Exposure Assessment (% of diet)	Food Ingestion Rate (kg/day)	Home Range (acres)
Cotton mouse [a] <i>(Peromyscus gossypinus)</i>	0.021 [b]	Seeds and some insects. [c]	88% Plants 10% Invertebrates 2% Soil [d]	0.0029 [e]	0.147 [f]
Short-tailed shrew <i>(Blarina brevicauda)</i>	0.017 [g]	Earthworms, slugs & snails, fungi, insects, and vegetation. [c]	78% Invertebrates 12% Plants 10% Soil [c]	0.0024 [e]	0.96 ± 0.09 [c]
Mourning dove <i>(Zenaidura macroura)</i>	0.13 [h]	Seeds, waste grains from agriculture, some insects, and occasionally snails. [i]	94% plants 1% Invertebrates 5% Soil [h]	0.0154 [j]	5 [i]
Eastern meadowlark <i>(Sturnella magna)</i>	0.087 [h]	Weed seeds, grass seeds, and invertebrates including beetles, grubs, bugs, grasshoppers, crickets, ants, and spiders. [h]	75% Invertebrates 20% Plants 5% Soil [h]	0.0119 [j]	5 [h]
Red fox <i>(Vulpes vulpes)</i>	4.69 [c]	Small mammals, birds, and invertebrates, as well as berries and other fruits. [c]	57% Small mammals 20% Invertebrates 10% Small birds 10% Plants 3% Soil [c]	0.24 [e]	250 [c]
Red-tailed hawk <i>(Buteo jamaicensis)</i>	1.02 [h]	Primarily small mammals; also birds, snakes, turtles, frogs, crickets, beetles, crayfish, and carp [c]	70% Small mammals 27% Small birds 3% Soil [c]	0.059 [j]	800 [c]

See notes at end of table.

Table 7-5 (Continued)
Exposure Parameters for Representative
Wildlife Species Selected for Site 17

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References:

- [a] Values for the deer mouse were used for the cotton mouse (U.S. Environmental Protection Agency [USEPA], 1993).
- [b] Average of adult male and female deer mice in North America (USEPA, 1993).
- [c] *Wildlife Exposure Factors Handbook* (USEPA, 1993).
- [d] Deer mouse value used for cotton mouse based on similarities in diet. Plant, invertebrate, and soil values are averages of values presented in the Wildlife Exposure Factor's Handbook. Other values were based on diet composition (USEPA 1993).
- [e] Calculated using the mammal equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = $0.0687 \times Wt^{0.822}$ (kg) (USEPA, 1993).
- [f] Average for male and female deer mice, Virginia/mixed deciduous forest (USEPA, 1993).
- [g] Mean of means reported for male and female shrews in summer and fall (USEPA, 1993).
- [h] Terres (1980).
- [i] DeGraaf and Rudis (1986).
- [j] Calculated using the bird equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = $0.0582 \times Wt^{0.861}$ (kg) (USEPA, 1993).

Notes: kg = kilograms.

% = percent.

kg/day = kilograms per day.

± = plus or minus.

Table 7-6
Estimation of Bioaccumulation Factors

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Receptor Group	Nature of Approach	General Approach
Terrestrial Plants		
Unit: mg/kg wet tissue per mg/kg dry soil	Literature Values	When available, literature values were used to estimate plant BAFs.
	SAR	When literature values were not available, plant BAFs for semivolatile organic compounds (SVOCs) were calculated using a regression equation based on the relationship between plant bioconcentration factors and the <i>n</i> -octanol-water partition coefficient for soil (K_{ow} s) of analytes (Travis and Arms, 1988). ¹ The study found that bioconcentration factors for vegetation are inversely proportional to the square root of the K_{ow} s of an analyte.
	Extrapolation and Empirical Data	When literature values were not available, plant BAFs for inorganic compounds were obtained from Baes et al. (1984). ²
	Assumption	Although evidence suggests that plants may transport organic analytes with $\log K_{ow}$ s < 5 (i.e., volatile organic compounds [VOCs]) from the roots into leafy portions (Briggs et al., 1982; Briggs et al., 1983), bioaccumulation data for VOCs are generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with $\log K_{ow}$ s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that transfer of VOCs from plant tissue to animal tissue does not occur.
Terrestrial Invertebrates		
Unit: mg/kg wet tissue per mg/kg dry soil	Literature Values	When no specific values were available, literature values were used to estimate BAFs for invertebrates.
	SAR	When literature values were not available for SVOCs, BAFs for soil invertebrates were estimated using a regression equation based on the uptake of organic chemicals into beef tissue from Travis and Arms (1988). ¹
	Assumption	Bioaccumulation data for VOCs is generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with $\log K_{ow}$ s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that soil invertebrates do not bioaccumulate VOCs.
Small Mammals		
Unit: mg/kg wet tissue per mg/kg wet food	Literature Values	When available, literature values were used to estimate BAFs for small mammals.
	SAR	When literature values were not available for SVOCs, BAFs for small mammals were estimated using a regression equation based on the uptake of organic chemicals into beef tissue from Travis and Arms (1988). ¹
	Extrapolation and Empirical Data	When literature values were not available, BAFs for small mammals for inorganics were derived from ingestion-to-beef biotransfer factors (BTFs) presented in Baes et al. (1984). ²
	Assumption	Bioaccumulation data for VOCs are generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with $\log K_{ow}$ s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that small mammals do not bioaccumulate VOCs.
See notes at end of table.		

Table 7-6 (Continued)
Estimation of Bioaccumulation Factors

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Receptor Group	Nature of Approach	General Approach
Small Birds		
Unit: mg/kg wet tissue per mg/kg wet food	Literature Values	When available, literature values were used to estimate BAFs for small birds.
	Assumption	Bioaccumulation data for VOCs are generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with $\log K_{ow}$ s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that birds do not bioaccumulate VOCs.
	No Information	BAFs were not obtained for SVOCs or for inorganic compounds as there is little bioaccumulation data available for birds. It was assumed that small birds do not accumulate VOCs
<p>¹ BTFs were converted to a BAFs (mg/kg tissue divided by mg/kg food) by multiplying by a food ingestion rate of 12 kg (dry weight) per day (average intake for lactating and nonlactating cattle reported in Travis and Arms, 1988).</p> <p>² BAFs derived from Baes et al. (1984). Values are based on analysis of literature references, correlations with other chemical and physical parameters, or comparisons of observed and predicted elemental concentrations in vegetative and reproductive plant material and soil. Data are based on dry weight and were converted to a fresh weight basis assuming that plants are 80 percent water. This is generally consistent with the water content of berries (82 to 87 percent water) and leafy vegetables (87 to 95 percent water), presented in Suter (1993). Grains contain a much lower percentage of water (approximately 10 percent); therefore, this assumption likely underestimates exposure to graminivores.</p> <p>Notes: mg/kg = milligrams per kilogram. BAFs = bioaccumulation factor. < = less than.</p>		

105 to 120 feet bls (see hydrogeological discussion in Chapter 5 of this report), which is below the root zone.

7.5 ECOLOGICAL EFFECTS ASSESSMENT. The ecological effects assessment discusses what measurement endpoints were used to evaluate potential adverse impacts to the assessment endpoints (i.e., the maintenance of receptor populations). The methods used for identifying and characterizing ecological effects for ECPCs in surface soil are described in the following subsections and in greater detail in Section 2.4 of the GIR (HLA, 1998).

Wildlife receptors, terrestrial plants, and terrestrial invertebrates are potentially exposed to ECPCs in surface soil at Site 17. The measures of adverse ecological effects for these receptors are discussed separately.

7.5.1 Terrestrial Wildlife As identified in the problem formulation, the assessment endpoint selected for terrestrial wildlife is the survival and maintenance of wildlife populations and communities present within the open areas of Site 17. Because no long-term wildlife population data is available at NAS Whiting Field, a direct measurement of this assessment endpoint is not possible. The literature-derived results of laboratory toxicity studies that relate the dose of a chemical in an oral exposure with an adverse response to growth, reproduction, or survival of a test population (avian or mammalian species) are used as a measure of the assessment endpoint. Wildlife ingestion toxicity data are presented in Tables E-2 in Appendix E.

Reference toxicity values (RTVs) are derived for each ECPC and representative wildlife species according to the data hierarchy presented in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, Interim Final (USEPA, 1997). The RTV represents the highest exposure level (e.g., concentration in the diet) not shown to produce adverse effects (e.g., reduced growth, impaired reproduction, increased mortality). For each ECPC, two RTVs representing lethal and sublethal effects are selected for each representative wildlife species. Lethal effects are those that result in mortality, while sublethal effects include those that impair or prevent reproduction or growth. The RTVs are assumed to be a measure of the assessment endpoints that are protective of survival, growth, and reproduction of terrestrial wildlife populations. Lethal RTVs are developed using the data hierarchy discussed in items 1, 2, and 3, while sublethal RTVs are derived using the methodology discussed in items 1 and 2.

- (1) For contaminants with well-documented adverse effects, the highest reported exposure level not resulting in significant adverse effects (i.e., a no observable adverse effect level (no observable adverse effects level [NOAEL])) was selected as the RTV.
- (2) Generally, one-tenth of the lowest observed adverse effect level (LOAEL) was selected as the RTV for analytes lacking an NOAEL value. However, application of the 10-fold uncertainty factor was based on consideration of the exposure duration, type of toxicity test, and the relationship between the selected measurement and assessment endpoints.
- (3) The lowest reported oral lethal dose to 50 percent of test population (LD_{50}) (oral dose [in mg/kg body weight-day] lethal to 50 percent of a

test population) was used to derive the lethal RTV if an NOAEL or LOAEL value (based on lethal effects) was not available. The lethal RTV is one-fifth of the lowest reported LD₅₀ value for the species most closely related to the representative wildlife receptor. One-fifth of an oral LD₅₀ value is considered to be protective against lethal effects for 99.9 percent of individuals in a test population (USEPA, 1986a). An assumption is made that the value represented by one-fifth of an oral LD₅₀ would be protective of 99.9 percent of the individuals within the terrestrial wildlife populations and represents a level of acceptable risk.

A summary of lethal and sublethal RTVs selected from the ingestion toxicity data is provided in Table E-3 in Appendix E.

If neither lethal nor sublethal toxicity information were available for a taxonomic group, no RTVs were identified and risks associated with the respective ECPC were not quantitatively evaluated. However, the absence of specific data for a taxonomic group does not imply that there is "no toxicological effect" associated with contaminant exposure by these receptors; therefore, potential risks to these taxonomic groups are qualitatively discussed in the Uncertainties Section (Section 7.7).

7.5.2 Terrestrial Plants and Invertebrates The assessment endpoints selected for terrestrial plants and soil invertebrates at Site 17 are reduction in the biomass of terrestrial plants and abundance of soil invertebrates. Site-specific toxicity data for plants and invertebrates at these areas are not available; therefore, the results of toxicity studies from the literature that relate the soil concentrations of a contaminant with adverse effects to growth, reproduction, or survival of a test population are used as a measure of the assessment endpoint. These study results are summarized for each ECPC in Appendix E, Tables E-4 (plants) and E-5 (invertebrates).

7.6 RISK CHARACTERIZATION. This section presents the risk characterization for ecological receptors exposed to surface soil at Site 17. Potential risks associated with exposures to ECPCs in surface soil at Site 17 are discussed separately for wildlife, terrestrial plants, and soil invertebrates.

Risks to wildlife are characterized by comparing the PDE concentrations (based on RME and CT exposure concentrations) for each surface soil ECPC with its respective RTV (estimated threshold dose for toxicity). Risks for terrestrial plants and soil invertebrates for Site 17 are evaluated by comparing toxicity benchmark values to RME and CT exposure concentrations.

7.6.1 Terrestrial Wildlife Risks for the representative wildlife species associated with ingestion and bioaccumulation of ECPCs in surface soil and prey items were quantitatively evaluated using HQs. HQs are calculated for each ECPC by dividing the PDE concentration by the selected lethal and sublethal RTV. HIs are determined for each receptor by summing the HQs for all ECPCs. When the estimated PDE is less than the RTV (i.e., the HQ is less than 1), the ERA assumes the chemical exposures are not associated with adverse effects to receptors and risks to wildlife populations are unlikely to be significant. For instance, if the calculated PDE, using the RME concentration, is less than the lethal RTV, then it is assumed that adverse effects to the survival of wildlife populations are

unlikely to occur. Similarly, if the reasonable maximum PDE is less than the sublethal RTV, then it is assumed that adverse effects to wildlife populations related to growth and reproduction are unlikely to occur. When an HI is greater than 1, a discussion of the ecological significance of the HQs comprising the HI is completed and risks from exposure to CT concentrations of ECPCs are evaluated. Although adverse effects to individual birds and mammals are possible at HI values equal to 1, the likelihood of population-level effects to terrestrial wildlife populations, which was selected as the assessment endpoint for the ERA, are considered negligible.

This hazard ranking scheme evaluates potential ecological effects to individual organisms and does not evaluate potential population-wide effects. Contaminants may cause population reductions by affecting birth and mortality rates, immigration, and emigration (USEPA, 1989b). In many circumstances, lethal or sublethal effects may occur to individual organisms with little population- or community-level impacts; however, as the number of individual organisms experiencing toxic effects increases, the probability that population effects will occur also increases. The number of affected individuals in a population presumably increases with increasing HQ or HI values; therefore, the likelihood of population-level effects occurring is generally expected to increase with higher HQ or HI values.

The HQs and HIs based on lethal and sublethal RTVs were calculated for each ECPC and each representative wildlife species. Tables E-6 through E-10 in Appendix E present the HQ and HI calculations. A summary of calculated risks to representative wildlife receptors for Site 17 is provided in Table 7-7.

Lethal effect HIs for representative wildlife species exposed to RME concentrations of ECPCs in surface soil from Site 17 were less than 1; therefore, risks are not predicted for these receptors (i.e., bioaccumulating chemicals are not sufficiently high to reduce survivability in terrestrial wildlife populations at Site 17).

With the exception of the red fox and red-tailed hawk, the sublethal HIs for RME and CT concentrations are greater than 1. A summary of the sublethal HIs for representative wildlife species at Site 17 is provided in Table 7-7. The primary risk driver for small mammals and small birds is cadmium. Cadmium was detected in 15 out of 34 sampling locations. Cadmium was detected in depression areas A, B, C, E, F, G, H, and I, as well as two nondepression areas (sample locations 17-SL-29 and 17-SL-31). Based on the results of the food-web model, sublethal effects associated with ingestion of cadmium in soil and food items are predicted for small mammal and bird populations at Site 17.

7.6.2 Terrestrial Plants Risks for terrestrial plants at Site 17 are evaluated by comparing the selected phytotoxicity RTVs to the RME and CT exposure concentrations. Table 7-8 presents the phytotoxicity RTVs and the RME and CT exposure concentrations for ECPCs selected for Site 17 surface soil. Phytotoxicity benchmark values are not available for 2-butanone, carbon disulfide, or TRPH. Therefore, it is not possible to quantitatively evaluate risks to terrestrial plants from exposure to these analytes.

As presented in Table 7-8, RME and CT exposure concentrations of aluminum and vanadium exceed their respective phytotoxicity benchmark values and only the RME

Table 7-7
Summary of Hazard Indices for Representative Wildlife Species
Associated with Exposure to Site 17 Surface Soil¹

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Ecological Receptors	Lethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Central Tendency EPCs
Cotton mouse	0.68	9.1	5.8
Mourning dove	0.022	11	7.5
Short-tailed shrew	0.97	9.9	5.3
Eastern meadowlark	0.083	6.6	4.5
Red fox	0.0048	0.065	0.039
Red-tailed hawk	0.000026	0.036	0.024

¹ Hazard index calculations are presented in Tables E-6 through E-11 in Appendix E.

Note: EPC = exposure point concentration.

Table 7-8
Ecological Risks for Plants and Invertebrates
Associated with ECPCs in Surface Soil at Site 17

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Analyte	Exposure Point Concentration ¹		RTV		RTV Exceeded? (by RME/by CT)	
	Reasonable Maximum Exposure	Central Tendency Exposure	Plant ²	Invertebrate ²	Plant ³	Invertebrate ³
Volatile Organic Compounds (µg/kg)						
2-Butanone	80	80	NA	NA	NA/NA	NA/NA
Carbon disulfide	26	26	NA	NA	NA/NA	NA/NA
Ethylbenzene	765	710	200,000	21,000	No/No	No/No
Methylene chloride	130	130	> 1,000,000	150,000	No/No	No/No
Toluene	567	567	200,000	NA	No/No	NA/NA
Trichloroethene	160	133	> 1,000,000	150,000	No/No	No/No
Xylene (Total)	14,472	5,739	> 1,000,000	21,000	No/No	No/No
Semivolatiles Organic Compounds (µg/kg)						
2-Methylnaphthalene	1,274	892	100,000	34,000	No/No	No/No
Butylbenzylphthalate	490	490	200,000	478,000	No/No	No/No
Naphthalene	963	773	100,000	34,000	No/No	No/No
bis(2-Ethylhexyl)phthalate	773	595	> 1,000,000	478,000	No/No	No/No
Inorganic Analytes (mg/kg)						
Aluminum	16,984	13,710	50	NA	Yes/Yes	NA/NA
Antimony	2	1.9	5	NA	No/No	NA/NA
Cadmium	3.7	2.5	3	50	Yes/No	No/No
Chromium	48.7	20	1	50	Yes/Yes	No/No
Copper	50.4	34.5	100	30	No/No	Yes/Yes
Lead	85.6	46.2	50	1,190	Yes/No	No/No
Vanadium	25	20.3	2	NA	Yes/Yes	NA/NA
Zinc	99.6	37	50	130	Yes/No	No/No
Total Petroleum Recoverable Hydrocarbons (TRPH) (mg/kg)						
TRPH	19,300	2,730	NA	NA	NA/NA	NA/NA

See notes at end of table.

Table 7-8 (Continued)
Ecological Risks for Plants and Invertebrates
Associated with ECPCs in Surface Soil at Site 17

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¹ Exposure Point Concentrations (EPCs) are presented in Table 7-2. The RME EPCs are equal to the lesser of the maximum detected concentration or the 95 percent UCL and CT EPCs are equal to the average of all concentrations. When the mean is greater than the RME EPC, then the RME EPC is used for both the RME and CT concentrations.

² Plant and invertebrate RTVs are presented in Appendix E, Tables E-4 and E-5, respectively. Generally, the plant RTVs are the lowest observed effect concentrations from among growth studies on plants in solid media. Invertebrate RTVs are the lowest concentration lethal to 50 percent of a test population (LD_{50}) such as the common earthworm *Eisenia fetida*. A conservative factor of 0.2 was applied to invertebrate RTVs; the resultant value should be protective of 99.9 percent of the population from acute effects (Neuhäuser et. al., 1986).

³ Comparison shown is RME EPC to RTV over CT EPC to RTV.

Notes: ECPC = ecological contaminant of potential concern.

RTV = reference toxicity value.

RME = reasonable maximum exposure.

CT = central tendency.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

NA = not available.

> = greater than.

mg/kg = milligrams per kilogram.

████ = shading indicates exceedances.

exposure concentrations of cadmium and lead exceed their respective phytotoxicity benchmark values.

Detected concentrations of aluminum in surface soil exceed the plant phytotoxicity value of 50 mg/kg in all 34 samples. Aluminum concentrations ranged from 4,500 to 29,900 mg/kg with an average detected concentration of 13,710 mg/kg. Although all detected concentrations of aluminum exceed the 50 mg/kg benchmark value, the average aluminum concentration at the site is less than the background screening concentration of 19,580 mg/kg. Therefore, it appears that detected concentrations of aluminum at Site 17 are not site-related.

Aluminum is the most abundant metal to be found in the earth's crust (8.1 percent). (CRC, 1972) Plant exposure to aluminum occurs mainly by absorption through their roots. Aluminum interferes with cell division in roots; decreases root respiration; fixes phosphorus in forms that are unavailable to the plant; interferes with uptake, transport, and use of calcium, magnesium, phosphorus, potassium, and water; and interferes with enzyme activities. Symptoms of toxicity include stubby, brittle roots; stunting maturity; and collapse of growing points. Seedlings are more susceptible to damage from aluminum toxicity than are older plants. Trees, especially pines, appear to have the greatest tolerance to aluminum (Will and Suter, 1995).

The phytotoxicity benchmark value of 50 mg/kg was based on a single seedling study. Therefore, a "low" degree of confidence is assigned to this benchmark value (Will and Suter, 1995).

Cadmium was detected in 15 out of 34 samples at concentrations ranging from 0.76 to 26.5 mg/kg (average concentration of 5.2 mg/kg). Cadmium was detected in concentrations greater than the phytotoxicity value (3 mg/kg) in 5 out of 34 sampling locations (17-SL-06, 17-SL-16, 17-SL-20, 17-SL-21, 17-SL-21A [duplicate], and 17-SL-29). Three of the five samples were collected in depression areas H and I, and two samples were collected in nondepression areas (samples 17-SL-06 and 17-SL-29).

When present in available forms, cadmium is readily taken up by roots and translocated and accumulated throughout the plant. Cadmium is chemically similar to zinc, an essential element. Competition between the two for organic ligands may explain some of the toxic effects of cadmium and the ameliorative effects of zinc on cadmium toxicity (Will and Suter, 1995). Cadmium depresses uptake of iron, manganese, and probably calcium, magnesium, and nitrogen. Cadmium is toxic at low concentrations. Symptoms resemble iron chlorosis and include necrosis, wilting, reduced zinc levels, and reduction in growth. The mechanisms of toxicity include reduced photosynthetic rate, poor root system development, reduced conductivity of stems, and ion interactions in the plant. Agronomic crops are more sensitive to cadmium toxicity than trees.

Chromium was detected in all 34 samples ranging from 4 to 82.1 mg/kg with an average of 20 mg/kg. All of the detected concentrations exceeded the phytotoxicity value of 1 mg/kg.

The chromium phytotoxicity benchmark value of 1 mg/kg is based on only two studies. Therefore, a "low" degree of confidence is assigned to this benchmark value (Will and Suter, 1995). In addition, both studies used the hexavalent form of chromium, which is known to be more toxic than the trivalent form. However,

the trivalent form of chromium is more often found in natural soils. Once in the soil solution, plants take up chromium into the roots, where it typically remains, bound to cell walls. Phytotoxic effects include stunted growth, poor root growth, and leaf curling. Chromium may also interfere with the metabolism of essential nutrients and enzyme reactions (Will and Suter, 1995).

Lead was detected in all 34 samples ranging from 3 to 207 mg/kg with an average of 46.2 mg/kg. Lead was detected at concentrations above the phytotoxicity value of 50 mg/kg at 13 of the 34 sampling locations. Concentrations of lead above the screening value were detected in depression areas B, F, G, H, and I. In addition, sample locations 17-SL-06, 17-SL-31, and 17-SL-33, which are not associated with the depressions, also contained elevated concentrations of lead.

Lead is taken up passively by roots and translocation to shoots is limited. It is bound to the outside of roots in the apoplast and in cell walls and organelles of absorbing roots. In the plant, lead may exist in naturally chelated form, or in pyro- or orthophosphate forms. The phytotoxicity of lead is relatively low compared with other trace elements. It affects mitochondrial respiration and photosyntheses by disturbing electron transfer reactions.

Vanadium was detected in all 34 samples at concentrations ranging from 6.4 to 71.3 mg/kg (average concentration of 20.3 mg/kg). The average vanadium concentration at the site is less than the background screening concentration of 28 mg/kg. Therefore, it appears that vanadium detected in surface soil samples may be from natural sources. Vanadium is a naturally occurring element often found in clays, crude oil, phosphate deposits, and iron ores (CRC, 1972).

The vanadium phytotoxicity benchmark value of 2 mg/kg was taken from an USEPA report titled *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals* (USEPA, 1980). This report does not identify how the vanadium value was derived or provide specific vanadium studies used to justify the 2 mg/kg value. Consequently, the confidence level of the vanadium benchmark is low.

Exposure of plants to vanadium occurs primarily through root sorption. After uptake, most vanadium remains in the root system in an insoluble form with calcium. Toxicity symptoms include chlorosis, dwarfing, and inhibited root growth. Vanadium inhibits various enzyme systems while stimulating others, the overall effect on plant growth being negligible.

Zinc was detected in all 34 samples ranging from 7.2 to 179 mg/kg with an average of 37 mg/kg. Zinc was detected in concentrations greater than the phytotoxicity value (50 mg/kg) in 6 out of 34 sampling locations (17-SL-06, 17-SL-11, 17-SL-13, S17-SL-16, 17-SL-21, and 17-SL-29). The average detected concentration of zinc did not however, exceed the phytotoxicity value.

Zinc is an essential micro-nutrient for plant growth. Zinc is taken up by roots, and transported throughout the plant. Toxic effects associated with excess zinc include chlorosis and inhibited plant growth. Zinc acts to inhibit carbon dioxide fixation, the transport of carbohydrates, and alter membrane permeability (Will and Suter, 1995).

In summary, detected concentrations of aluminum, cadmium, chromium, lead, vanadium, and zinc in surface soil from Site 17 exceed their respective

phytotoxicity benchmark values. Although the RME concentrations of aluminum (16,984 mg/kg), chromium (49 mg/kg), and vanadium (25 mg/kg) exceed their respective phytotoxicity benchmark values of 50 mg/kg, 1 mg/kg, and 2 mg/kg, the background screening concentrations of these inorganic analytes (aluminum at 19,580 mg/kg, chromium at 14 mg/kg, and vanadium at 28 mg/kg) also exceed the benchmark values. Therefore, it appears that detected concentrations of aluminum, chromium, and vanadium in the Site 17 surface soil may be representative of background conditions at NAS Whiting Field. In addition, Will and Suter expressed a low confidence in these phytotoxicity values.

As previously mentioned for cadmium and lead, only the RME concentrations of these analytes exceeded their respective benchmark values, suggesting that the average exposure are unlikely to result in adverse effects to the plants at Site 17. Analyte concentrations above the respective phytotoxicity benchmark value were detected both inside and outside of the depressions. During the 1995 site characterization, stressed vegetation was not identified inside or outside the depression areas. Alterations in the vegetative communities of the depressions are attributed to intermittent increased water levels. In addition, maintenance activities restrict the succession of the vegetation community to grasses and other plants tolerant of mowing. The results of the evaluation suggest that exposure to aluminum, cadmium, chromium, lead, vanadium, and zinc in surface soil is not likely to result in reduction in plant biomass or plant cover such that small mammal or bird populations would be impacted.

7.6.3 Terrestrial Invertebrates Risks for terrestrial invertebrates at Site 17 are evaluated by comparing invertebrate toxicity benchmark values to RME and CT exposure concentrations. Table 7-8 presents the invertebrate RTVs and the RME and CT concentrations for Site 17 surface soil ECPCs. Invertebrate benchmark values are not available for 2-butanone, carbon disulfide, toluene, aluminum, antimony, vanadium or TRPH. Therefore, it is not possible to quantitatively evaluate risks to terrestrial invertebrates from exposure to these analytes.

With the exception of copper, all RME concentrations of ECPCs are below the available invertebrate toxicity benchmark values. Copper was detected in all 34 samples at concentrations ranging from 2.4 to 218 mg/kg (with an average concentration of 34.6 mg/kg). Only 5 out of 34 sample locations (17-SL-16, 17-SL-20, 17-SL-21, 17-SL-21D [duplicate], 17-SL-23, and 17-SL-29) contained copper in concentrations greater than the invertebrate benchmark value of 30 mg/kg. These samples were collected from depression areas G, H, and I and the nondepression sample location 17-SL-29.

A comparison between the copper RME concentration and the invertebrate benchmark value indicates the possibility for adverse effects on growth, reproduction and survival. However, the relative small number of samples (5 out 34 samples) exceeding the benchmark value suggest that any adverse effects to invertebrates will be at a localized scale.

7.7 UNCERTAINTY ANALYSIS. The objective of the uncertainty analysis is to discuss the assumptions of the ERA process that may influence the risk assessment results and conclusions. Table 2-5 of the GIR presents several general uncertainties inherent in the risk assessment process. (HLA, 1998)

Specific uncertainties associated with exposure to surface soil at Site 17 include the following:

- Risks to avian species may have been underestimated because bioaccumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with several ECPCs were not evaluated for avian species. If the toxicological and contaminant transport data obtained from studies conducted on mammals were used to estimate risks to avian species, then risk estimates for birds would be higher. However, there is also uncertainty in assuming the metabolic functions of mammals and birds are similar enough to use intertaxonomic surrogates.
- Risks to adult amphibians and reptile species were not estimated for surface soil ECPCs because bioaccumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with ECPCs are uncertain for these species. Intertaxonomic surrogates were not used to calculate dietary risks to reptiles because of the uncertainty associated with extrapolation of data from endothermic to essentially ectothermic species.
- BAFs for plant material are based on the assumption that plants are 80 percent water. This assumption applies to terrestrial and leafy vegetables, but does not apply to grains, which have a moisture content of only 10 percent. Because the diet of the cotton mouse and the mourning dove consist primarily of grains, the risks to these receptors may be underestimated.
- There is uncertainty associated with the ingestion toxicity data derived from the IRIS and Registry of Toxic Effects of Chemical Substances (RTECS) database. The IRIS and RTECs data were obtained in 1993 and 1995, respectively, and the primary literature citation was not provided; therefore, the primary literature for these studies was not reviewed. This may have resulted in the selection of RTVs that may overestimate or underestimate potential risks to wildlife receptors. RTVs for carbon disulfide and xylenes were obtained from IRIS and the RTV for 2-butanone, methyl chloride, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, cadmium, and lead were obtained from RTECs.
- Although selected as an ECPC for surface soil, TRPH was not evaluated in the ERA for terrestrial wildlife (i.e., mammals and birds), terrestrial plants, and soil invertebrates because toxicological benchmark values are not available. TRPH was detected at 30 of 34 locations at concentrations ranging from 2.3 to 19,300 mg/kg. It is believed that detected concentrations of TRPH are likely the result of burning aviation gasoline or jet fuel poured in the depressions as part of the firefighting training activities. Based on the detected concentrations of VOCs and SVOCs constituents, and the finding of no risk associated with these constituents, it is unlikely that detected concentrations of TRPH in the surface soil at Site 17 pose a risk to ecological receptors.

7.8 SUMMARY OF ECOLOGICAL ASSESSMENT FOR SITE 17. Potential risks for ecological receptors were evaluated for ECPCs in surface soil at Site 17. Risks associated with exposures to ECPCs in Site 17 surface soil were evaluated for terrestrial wildlife based on a model that estimates the amount of contaminant exposure obtained via the diet and incidental ingestion of surface soil. The estimated dose derived from the model for each representative wildlife species was compared to a reference toxicity dose representing the thresholds for lethal and sublethal effects. Lethal risks were not identified for terrestrial wildlife resulting from exposure to ECPCs in surface soil; therefore, effects relating to the survivability of wildlife receptor populations at Site 17 are not expected to occur. Sublethal risks (i.e., potential reductions in the reproduction and growth of terrestrial wildlife) associated with the ingestion of cadmium in surface soil and food items are predicted for small mammals and birds at Site 17.

Reduction in terrestrial plant biomass used as forage material was evaluated by comparing the RME and CT exposure concentrations for surface soil with toxicity benchmark values. Based on this comparison, aluminum, cadmium, chromium, lead, vanadium, and zinc exceed their respective phytotoxicity benchmark values. However, the RME concentrations for aluminum and vanadium were below the background screening concentration, suggesting these concentrations may be representative of background conditions. Although RME concentrations of cadmium, lead, and zinc exceeded their respective benchmark values, CT exposure concentrations of these constituents were below the benchmark values. In addition, no evidence of stressed vegetation inside or outside of the burn pits was observed at Site 17. Therefore, it is unlikely that plant cover and/or biomass at Site 17 would be reduced such that small mammals and birds would be affected. The burn pits were covered with clean soil during the February 1999 interim remedial action and reseeded.

Reduction in soil invertebrate biomass used as forage material was evaluated by comparing the RME and CT concentrations for each ECPC identified in surface soil to its respective invertebrate benchmark value. Detected concentrations of copper exceeded its benchmark value at only five of 34 sampling locations, indicating that the potential for adverse effects is limited to several location areas. Therefore, reduction in invertebrate biomass across the entire Site 17 area is not expected to occur.

In summary, only sublethal risks associated with ingestion of cadmium in surface soil and food items are predicted for small mammals and birds at Site 17.

8.0 CONTAMINANT FATE AND TRANSPORT

This chapter discusses the fate and transport of human health and ecological chemicals of potential concern detected in soil and groundwater samples at Site 17. Fate, in the context of this chapter, refers to the ultimate disposition of a given chemicals of potential concern following its release into the environment. Transport refers to the mechanism(s) by which a given chemical released into the environment will arrive at its fate. Explanation of the fate and transport of chemicals in the environment can be very complicated or very simple, depending on the physical, chemical, and biological characteristics of the compound or metal considered and the environment into which that compound is released.

Several organic compounds and inorganics were detected in soil and groundwater sampled at Site 17. Because of the number of potential chemicals detected and the myriad fate and transport scenarios possible for those chemicals in the media, this discussion will focus only on those chemicals that may pose adverse risk to human or ecological receptors, as identified by the HHRA (Chapter 6.0) and the ERA (Chapter 7.0) in this report.

The following discussion of contaminant fate and transport is divided into two sections. Section 8.1 discusses potential migration routes of a chemical(s) in the media evaluated and does not focus specifically on media found to be of concern at Site 17. The site-specific persistence, fate, and transport of those compounds and elements found to pose a potential risk to human health or the environment are discussed in Section 8.2.

8.1 POTENTIAL ROUTES OF MIGRATION. Several routes of migration are possible for a contaminant in the various media: air, soil, surface water, groundwater, and biota. These routes are summarized below.

Air. Gases and particulate material can be transported in the atmosphere. Organic compounds, metals, and metal complexes that exist as gases at surface temperature and pressure may disperse or diffuse into the air, and particulates may become entrained in air and thereby migrate. The extent to which gaseous constituents and particulate material remain airborne is a function of the level of excitation of the air (wind and temperature) and fate processes acting on the constituent and, for particulates, their density. Particulate material as discussed herein consists of organic compounds and inorganic material that would otherwise not be present in a gaseous medium under atmospheric conditions.

Soil. The primary agents of migration acting on soil include wind, rainwater, running water, biological activity, and human activity. Wind commonly transports soil in the form of particulate material. Rainwater may cause soil to migrate either by washing soil particles downward into the subsurface or by carrying soil particles over land to surface water bodies or other areas of deposition. The amount and type of vegetative cover and surface disturbance affects the degree to which wind and water cause soil to migrate.

Surface Water. The mechanisms for migration of constituents in surface water are dissolution and suspension. Several organic compounds and metals are soluble in water and can be transported in the aqueous phase. Other organic compounds and elements are not soluble in water, but may be transported by surface water via

suspension. The amount of suspended particulate material in surface water is largely a function of the water's energy; as that energy decreases, suspended material will settle and become part of the soil or sediment. Colloidal material may remain in suspension (by electrochemical forces) in water of very low energy (e.g., standing water).

Sediment. Saltation, traction, suspension, biological action, and human action are the primary mechanisms of migration for sediment. Physical, chemical, and biological processes affecting a constituent will determine where and how migration from sediment will occur.

Groundwater. Groundwater is a liquid medium capable of transporting constituents as colloidal forms, as complexes, as pure-phase liquids, or as dissolved-phase liquids. Organic compounds and elements generally reach groundwater either by being placed directly into the water table (e.g., disposal pits) or by being leached from soil or solid waste to the water table by physical or chemical processes. Groundwater may discharge to the land surface, surface water bodies, other aquifers, or pumping wells. The migration of constituents from groundwater upon discharge depends on the chemical and/or physical processes acting upon that individual constituent in the medium to which it is discharged.

Biota. Biota may be considered a medium for migration of certain organic compounds and inorganics. Several compounds and elements are known to accumulate in the tissues of organisms at various levels in the food chain. As these organisms are consumed by other organisms, compounds and elements are accumulated in their tissue and passed on to organisms higher in the food chain. In this manner, contaminants may be transported by biota. Additionally, some organisms disturb bed sediments in streams and rivers. This disturbance can cause organic compounds and elements to be transported downstream as suspended material in surface water.

8.2 CONTAMINANT PERSISTENCE AND FATE. The discussion of contaminant persistence and fate in the environment is divided into three subsections. Subsection 8.2.1 discusses the processes that control the persistence and fate of organic compounds and inorganics in the environment. Subsection 8.2.2 discusses the primary persistence and fate characteristics of the constituents detected at Site 17. Subsection 8.2.3 discusses contaminant transport for Site 17.

8.2.1 Processes The persistence and fate of chemical constituents in the environment depends on various chemical, physical, and biological processes. The predominant processes affecting the environmental persistence and fate of chemical constituents include solubility, photolysis, volatilization, hydrolysis, oxidation, chemical speciation, complexation, precipitation or coprecipitation, cationic exchange, sorption, biodegradation or biotransformation, and bioaccumulation. These processes are briefly summarized below.

Solubility. The solubility of chemical constituents in water is important in assessing their mobility in the environment. This is particularly important for the transport and ultimate fate of chemicals from soil and sediment to water (i.e., groundwater and/or surface water). Generally for organic compounds, aqueous solubility is a function of molecular size, molecular polarity, temperature, and the presence of other dissolved organic cosolvents. For metals and other inorganic parameters, solubility is generally controlled by chemical

speciation, pH, oxidation reduction (Eh), oxygen content, and the presence of dissolved and/or colloidal organic compounds (e.g., humic and fulvic acids) or other inorganic ion species (e.g., hydroxides and sulfates) (USEPA, 1979). Increased solubility is usually directly related to increased environmental mobility with groundwater and/or surface water being the principal transport medium. Therefore, solubility is a significant factor affecting the fate of a compound or element in the water environment.

Photolysis. Many chemical constituents, particularly organic compounds, are susceptible to photolytic degradation either directly or indirectly. Direct photolysis involves a splitting of the chemical compound by light, whereas indirect photolysis occurs when another compound is transformed by light into a reactive species (i.e., usually a hydroxyl radical) that reacts with and modifies the original compound. In general, photolysis primarily occurs within the atmosphere, although it may also occur to a limited extent in surface water and/or soil under certain environmental conditions (USEPA, 1979).

Volatilization. Volatilization of organic chemicals from soil or water to the atmosphere is an important pathway for chemicals with high vapor pressures. For organic compounds, volatilization is a function of partial pressure gradients, temperature, and molecular size and is more likely to occur for compounds with low molecular weights. In addition, certain metals such as mercury, arsenic, and lead are capable of undergoing biologically mediated transformations (i.e., alkylation) that form volatile end products. Volatilization is important for the transport of certain chemical constituents from surface soil (i.e., vadose zone), sediment, and surface water and is evaluated using Henry's law and other associated chemical-specific rate constants.

Hydrolysis. Hydrolysis involves the decomposition of a chemical compound by its reaction with water. The rate of reaction may be promoted by acid (hydronium ion [H_3O^+]) and/or base (hydroxyl ion [OH^-]) compounds. In general, most organic compounds are resistant to hydrolytic reactions unless they contain a functional group (or groups) capable of reacting with water. Metallic compounds, however, generally dissociate readily in water depending upon the aqueous environmental conditions (e.g., pH and ionic strength). For metals, hydrolytic dissociation is an indirect process that affects the primary fate and transport mechanism of aqueous solubility.

Oxidation. The direct oxidation of organic compounds in natural environmental matrices may occur, but this is generally a slow, insignificant transformation mechanism of minimal importance (USEPA, 1979). However, some inorganic compounds may be rapidly oxidized under naturally occurring environmental conditions when the surrounding environment changes from anaerobic to aerobic conditions.

Chemical Speciation. Chemical speciation is important primarily for metals that may exist in multiple forms in the environment, particularly within aqueous matrices. In general, the aqueous speciation of metals depends primarily upon the relative stabilities of individual valence states (which are element-specific), oxygen content, pH and Eh condition, and the presence of available complexing agents and/or other cations and anions (USEPA, 1979). Because various metallic species exhibit differential aqueous solubilities and differential mobilities within soils and/or sediments (USEPA, 1979), the particular speciation of an individual metal will greatly affect its environmental mobility.

Complexation. For metals, complexation with various ligands is an important process because these complexes may be highly soluble in water. Complexation may, therefore, greatly enhance mobility within environmental matrices, particularly in groundwater and surface water, depending upon the aqueous solubility of the resulting complex. Complexation depends upon numerous factors such as pH, Eh, type and concentration of complexing ligands, and other ions present (USEPA, 1979).

Most metals are capable of forming numerous organic and/or inorganic complexes in the natural environment (USEPA, 1979). Metals may form organo-metallic complexes, especially with naturally occurring organic acids (i.e., humic and fulvic acids). In some cases, these metallic species may exhibit varying affinities for different organic ligands (i.e., mercury and arsenic for amino acids and their derivatives) (USEPA, 1979). Metals may also form metallo-inorganic complexes with inorganic ligands such as carbonate, halogens (usually chlorine), hydroxyl, and sulfate (USEPA, 1979). However, organo-metallic complex formation is usually favored over metallo-inorganic complexes.

Precipitation and Coprecipitation. Both chemical precipitation and coprecipitation are important removal mechanisms, particularly for metals and metallo-cyanides in the environment. Precipitation and/or coprecipitation reactions depend on numerous aqueous environmental conditions such as pH, Eh, organic ligands present, oxygen content, and cationic and anionic species present (USEPA, 1979). Depending on the specific conditions, the removal of aqueous metallic species and metallo-cyanides from groundwater and/or surface water can greatly affect the environmental mobility of a metal and, hence, its ultimate fate and transport.

Cation Exchange. Cation exchange is important primarily for metals and other ions that may substitute with other cations of similar charge and size within the lattice structure of clay minerals in soil and/or sediment (USEPA, 1979). Therefore, this process can significantly affect the mobility of an aqueous metal cation by removing it from solution under certain environmental conditions.

Sorption. The sorption of chemical constituents by inorganic particulate matter (i.e., soil or sediment) and organic compounds is an important process that affects mobility in the environment. This process is particularly important for the fate and transport of chemicals from soil or sediment to water (i.e., groundwater and surface water). In general, most metals exhibit a potential for adsorption to inorganic particulate matter and organic compounds (USEPA, 1979). Organic compounds also exhibit sorptive capability, but show greater variability in their ability to sorb to particulate or organic matter. The tendency for organic compounds to sorb to soils or sediment is reflected in their organic carbon partitioning coefficients (K_{oc}). K_{oc} is a measure of relative adsorption potential. The normal range of K_{oc} values is from 1 to 10^7 with higher values indicating greater sorption potential. Actual adsorption is chemical-specific and is largely dependent on the organic content of the soil. The fraction of organic carbon, f_{oc} , in soil times the K_{oc} is defined as the distribution coefficient (K_d). The K_d is a ratio of the concentration adsorbed to the concentration partitioned to water.

Regardless of chemical class, sorption is a reversible process whereby desorption can be favored over sorption under certain environmental conditions (e.g., low pH for metals). For organic compounds in general, as the molecular weight

increases and the aqueous solubility decreases (i.e., low polarity and high hydrophobicity), the sorptive binding affinity increases (i.e., K_{oc} increases). The tendency for chemical constituents to adsorb to inorganic particulate and/or organic compounds is a particularly important process because sorption to soils and/or sediments can effectively reduce a chemical constituent's mobility.

Biodegradation or Biotransformation. Biodegradation is a result of the enzyme-catalyzed transformation of chemicals. Organisms require energy, carbon, and essential nutrients from the environment for their growth and maintenance. In the process, chemicals from the environment will be transformed by enzymes into a form that can be used by the organism. The biodegradation rate is the rate by which contaminants will be degraded. The rate is a function of microbial biomass and a chemical's concentration under given environmental conditions. When a pollutant is introduced into the environment, there is often a lag time before biodegradation begins as the organism generates an enzyme capable of digesting the chemical. Cometabolism occurs when a pollutant can be biotransformed only in the presence of another compound that serves as a carbon and energy source (USEPA, 1979).

Bioaccumulation. Bioconcentration and bioaccumulation data are important when evaluating the impact of chemicals in the aquatic environment. The process is characterized by hydrophobic chemicals that can be partitioned into fat and lipid tissues and inorganic chemicals that can be partitioned into bone marrow. The bioconcentration factor is a measure of the concentration of a chemical in tissue (on a dry-weight basis) divided by the concentration in water, and is a commonly used parameter to quantify bioconcentration (USEPA, 1979). The process is significant because bioaccumulation magnifies up through the food chain.

8.2.2 Persistence and Fate of Site 17 Chemicals of Potential Concern This section discusses the persistence and fate characteristics for CPCs detected at Site 17. To focus the discussion of persistence and fate characteristics, only those constituents that were (1) identified by the HHCPCs or ECPCs (presented in Chapters 6.0 and 7.0, respectively) as chemicals of potential concern and (2) those constituents that were present above relevant standards will be addressed. These constituents are summarized below by medium for Site 17.

Human Health Assessment Constituents

- Surface soil: TRPH and six inorganics (aluminum, antimony, arsenic, cadmium, chromium, iron, and vanadium).
- Subsurface soil: two inorganics (arsenic and iron).
- Groundwater: two inorganics (aluminum and iron).

Ecological Assessment Constituents

- Surface soil: seven VOCs (2-butanone, carbon disulfide, ethylbenzene, methylene chloride, toluene, trichloroethene, and xylenes), four SVOCs (2-methylnaphthalene, butylbenzylphthalate, naphthalene, and bis(2-ethylhexyl)phthalate) TRPH, and six inorganics (aluminum, antimony, cadmium, copper, lead and vanadium).
- Subsurface soil: none selected.

- Groundwater: none selected.

The fate and persistence characteristics of these constituents are summarized below by analytical fraction.

VOCs. Acetone (C_3H_6O) is both naturally occurring and man-made compound. It has been identified as a naturally occurring volatile metabolite of both plants and insects; forest fires have also been identified as a natural source of the compound. Acetone is commonly used as a solvent and is a by-product of several manufacturing processes (Howard, 1990).

The majority of acetone released to the environment by emissions to the atmosphere; in the atmosphere it will break down by photolysis or be removed by rain. If released to the soil it will both volatilize and leach into the ground. In soils and groundwater, acetone will readily biodegrade and is not likely to significantly adsorb to either soil or sediment (Howard, 1990).

Acetone is a commonly recognized field- or laboratory-derived contaminant according to the *National Functional Guidelines for Organic Data Review* (USEPA, 1991b). As such, the detected concentrations of acetone at Site 11 may not be related to past disposal activities at the site. Furthermore, given the fact that acetone readily volatilizes, it is unlikely that surface soil would retain detectable quantities of acetone for 25 years (waste disposal at Site 11 ended in approximately 1970).

Carbon disulfide is a natural product of anaerobic biodegradation and is released to the atmosphere from oceans and land masses. Geothermal sources also contribute to carbon disulfide emissions. It may also be released as emissions and in wastewater during its production and use, in the production of viscose rayon, cellophane, and carbon tetrachloride, and as a solvent and fumigant. If released on land, carbon disulfide will be primarily lost by volatilization. It may adsorb to the soil and biodegrade. It may also readily leach into the ground where it may biodegrade. If released into water, carbon disulfide will be primarily lost due to volatilization. Adsorption to sediment and bioconcentration in fish should not be significant. In the atmosphere, carbon disulfide degrades by reacting with oxygen and photochemically produced hydroxyl radicals.

Methylene chloride is a man-made chemical used as an industrial solvent and a paint stripper. Most of the methylene chloride released to the environment results from its use as an end product by various industries. Methylene chloride is not strongly sorbed to soils or sediment and is likely to be highly mobile in soils, thus can be expected to leach into groundwater. Methylene chloride has a vapor pressure of 349 millimeters of mercury (mmHg) at 20 degrees °C; therefore, it tends to volatilize to the atmosphere from water and soil. Because of its high vapor pressure, volatilization to the atmosphere is the most likely fate process (Agency for Toxic Substances and Disease Registry [ATSDR], 1993a).

Volatilization is the predominant fate and migration process near the land surface for VOCs detected at Site 17. Once these compounds have migrated below the land surface or to groundwater, biodegradation becomes a potentially significant mechanism (Howard, 1990).

Xylenes are chemicals primarily man-made from petroleum or coal. Xylene is a colorless liquid with a sweet odor that evaporates and burns easily. Xylene does

not mix well with water, but does mix well with alcohol and other chemicals. Xylene has three isomers: meta-xylene, ortho-xylene, and para-xylene, (respectively m-, o-, and p-xylene), which when mixed together are termed xylenes.

Xylene is used as a solvent in the printing, rubber, cleaning, and leather industries, and as a thinner for paints. Xylene is found in gasoline and airplane fuel and is used as a material and/or ingredient in the manufacture of some plastics.

When spilled on land, xylenes either volatilize or leach into the ground. Sorption is an important factor in soils with high organic matter or high carbon content. Xylenes are relatively mobile in soil with low carbon content and may leach into groundwater depending on soil conditions. Xylenes in groundwater are known to persist for several years (ATSDR, 1993b).

SVOCs. Bis(2-ethylhexyl)phthalate (also known as di(2-ethylhexyl)phthalate) ($C_{24}H_{38}O_4$) is principally used as a plasticizer in the production of polyvinyl chloride (PVC) and vinyl chloride resins. PVC is used in many common household items such as toys, vinyl upholstery, shower curtains, adhesives, and as a component of paper and paperboard. Bis(2-ethylhexyl)phthalate has also been used as a solvent, an acaricide in orchards, and as an inert ingredient in pesticide products (ATSDR, 1991).

Bis(2-ethylhexyl)phthalate is a widely used chemical that enters the environment primarily through the disposal of industrial and municipal wastes in landfills. Bis(2-ethylhexyl)phthalate tends to adsorb strongly to soil and sediments and to bioconcentrate in aquatic organisms. Sorption, bioaccumulation, and biodegradation are likely to be competing processes, with the dominant fate being determined by local environmental conditions (ATSDR, 1991).

Bis(2-ethylhexyl)phthalate has a strong tendency to be adsorbed to atmospheric particulate matter, soils, and sediments. Bis(2-ethylhexyl)phthalate biodegradation in soil is slow because strong adsorption reduces the availability for degradation. Biodegradation is expected to occur under aerobic conditions. Bis(2-ethylhexyl)phthalate may slowly volatilize into air. In air, direct photolysis and photooxidation are not likely (ATSDR, 1991).

Bis(2-ethylhexyl)phthalate is relatively insoluble; however, it may leach to the groundwater in the presence of common organic solvents such as alcohols and ketones. Bis(2-ethylhexyl)phthalate in the water will undergo biodegradation under aerobic conditions. Chemical hydrolysis occurs too slowly to be important (ATSDR, 1991).

Two polynuclear aromatic hydrocarbons (PAHs) were identified as CPCs (naphthalene and 2-methylnaphthalene) at Site 17. PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances. PAHs can either be man-made or occur naturally. A few of the PAHs are used in medicines and to make dyes, plastics, and pesticides, while others are contained in asphalt used in road construction. There are more than 100 different PAH compounds (ATSDR, 1993c).

In air, PAHs are found sorbed to particulates and as gases. Particle-bound PAHs can be transported long distances and are removed from the atmosphere through precipitation and dry deposition. PAHs are transported in surface waters by

volatilization and sorption to settling particles. The compounds are transformed in surface waters by photooxidation, chemical oxidation, and microbial metabolism. Sorption of PAHs to soil and sediment increases with increasing organic content and is also directly dependant upon particle size. Microbial metabolism is the major process for degradation of PAHs in soil environments. PAHs have relatively low solubilities, but if transported through soils by either leaching or colloidal movement, PAHs can enter groundwater and be transported within an aquifer (ATSDR, 1993c).

Inorganics. Aluminum is the third most common element in the environment, though not generally found in elevated concentrations in groundwater. However, aluminum is known to complex readily, and high concentrations present in groundwater are generally due to silt-sized particles of aluminum-containing compounds often present as clays or aluminum hydroxides. Complexing and polymerization of the most common valence state of aluminum, Al^{+3} , represents the predominant transport mechanism for aluminum in the environment.

Antimony is abundantly found in the Earth's crust and is commonly used as a hardening alloy for lead storage batteries, cable sheaths, or a bearing/coating metal with semiconductor capabilities. Antimony is very insoluble in water; however, it is soluble under elevated temperatures and oxidizing (e.g., acidic) conditions. In reducing conditions, antimony precipitates to the metal form and in the presence of sulfur as an insoluble sulfide. Under high oxidizing conditions, antimony precipitates in the oxide or hydroxide form and settles into bed sediments.

The most common fate process affecting antimony is adsorption. The ionic radius of antimony is similar to that of lead, thus the fate of antimony in the environment is believed to be similar to that of lead (USEPA, 1979). Antimony does not readily bioaccumulate (USEPA, 1979). The adsorption of antimony to clay particles is pH dependent. Adsorption is more effective under acidic conditions, rather than alkaline conditions.

Arsenic has two stable forms in solution in groundwater, arsenate (As^{5+}) and arsenite (As^{3+}). In groundwater with pH ranging from 3 to 7, the monovalent arsenate anion H_2AsO_4^- is the dominant form. Upon entering surface water, via groundwater discharge, arsenic may partition to sediment from solution by hydrous iron oxide adsorption and/or coprecipitation (or a combination of both) with sulfides in the sediment. The Eh and pH conditions of the surface water and sediment govern the effectiveness of these mechanisms (adsorption and coprecipitation) as a sink for arsenic. These mechanisms appear to be the major inorganic factors controlling arsenic concentrations in surface water (Hem, 1992).

Arsenic may be very mobile in the aquatic environment, cycling through the water column, sediment, biota, and air. Most arsenic released into the environment (on the Earth's surface) eventually ends up in either sediments (in stream beds or lakes) or in the oceans. Eh and pH conditions largely govern the fate of arsenic (USEPA, 1979).

Cadmium is persistent in the environment as an ore or mineral. Cadmium is not readily soluble in water, but soluble in acids and alkalis. Cadmium released into the environment from the Earth's surface eventually ends up in either sediments (in stream beds or lakes) or in the oceans. Eh and pH conditions largely govern the fate of cadmium (USEPA, 1979).

Chromium is present in minerals predominantly as Cr³⁺. Dissolved chromium may be present as trivalent cations or as anions in which the oxidation state is Cr⁶⁺ (hexavalent). Six different ionic forms of chromium are considered to be stable in aqueous systems. The reduced forms are Cr³⁺, Cr(OH)₂⁺, and Cr(OH)₋₄. Anionic forms present under oxidizing conditions include dichromate Cr₂O₇²⁻ and chromate CrO₄²⁻. The dissolved forms that predominate in reduced systems between pH 5 and pH 9 probably are CrOH²⁺ and Cr(OH)₂⁺. Concentrations of chromium in natural waters that have not been affected by waste disposal are commonly less than 10 µg/l (Hem, 1992).

Iron is the second most abundant element in the environment, though dissolved concentrations present in groundwater are generally low. The chemical behavior of iron and its solubility depend upon the oxidation intensity and pH of the environmental system in which it is found. Iron exists in two valence states, Fe²⁺ and Fe³⁺, with the Fe²⁺ or ferrous form the most common form of iron found in solution in the reducing conditions within the groundwater environment. Dissolved iron generally sorbs to sediment and may precipitate as iron hydroxide or may oxidize to form iron oxides and iron oxyhydroxides (USEPA, 1979). Iron also may complex with organic molecules, especially fulvic and humic acids. Aerated or flowing water with a pH in the range of 6.5 to 8.5 should contain little dissolved iron.

Vanadium commonly exists in the V³⁺, V⁴⁺, and V⁵⁺ valence states. Its aqueous chemistry is quite complex, but overall concentrations seem to be controlled more by availability of a vanadium source rather than equilibrium considerations. Bioconcentration of vanadium by vegetation has been reported by several researchers.

TRPH. TRPH is composed of several different VOCs and SVOCs present in petroleum products or their breakdown products. VOCs, being more volatile and having lower K_{oc} values than SVOCs, are likely to begin volatilization shortly after deposition of the petroleum compound. The remaining SVOCs will have fate behaviors similar to PAHs. Due to the age of the site (approximately 30 years since active usage), the TRPH compounds present at Site 17 are most likely heavy hydrocarbons that strongly adhere to organic soil. As a result, the primary fate of TRPH constituents in the soil at Site 17 will most likely remain adhered to the soil and will slowly biodegrade under the microbial activity of subsurface soil.

8.2.3 Transport of Contaminants This section discusses the transport of chemicals in various media at Site 17. All media, surface soil, subsurface soil, surface water, sediment, and groundwater will be discussed.

Surface Soil. Transport of the CPCs in soil is dependent on several factors, as discussed in Section 8.1. The primary agents of migration acting on soil include wind, water, and human activity. Soil can also act as a source medium from which the CPCs are transported to other media. Transport of the CPCs from soil via wind is not expected to be a major transport mechanism because of the vegetation present at Site 17. Vegetative cover is an effective means of limiting wind erosion of soil. Humans are effective at moving soil and can greatly affect the transport of soil-bound chemicals at hazardous waste sites. Under the current use of Site 17, human activity is not a major transport mechanism for the CPCs in soils. This condition may change based on the future use of Site 17.

Water can cause the transport of soil; therefore, the CPCs in soil will be transported, via the mechanisms of physical transport of soil or the leaching of constituents from the soil to groundwater. Soil erosion, the physical transport of soil via surface water runoff, is currently not considered a major mechanism for the transport of the CPCs in soil at Site 17 because of (1) the low grade (slope) of the land surface at the site, (2) the vegetation at the site, and (3) the nature of the constituents remaining in the soil at the site.

The majority of the analytes detected in the soil at Site 17 are likely to remain attached to the soil because most metal analytes adsorb readily to or are natural constituents of clays and other minerals.

Surface Water. There are no permanent surface water bodies associated with Site 17. Currently, transport of the CPCs at Site 17 via runoff is not considered an important transport mechanism because of (1) the low slope of the land surface at the site, (2) high infiltration capacity of soil at the site, (3) the vegetation at Site 17, and (4) the tendency of the surface soil contaminants at the sites to remain attached to clays in the soil.

When Site 17 was an active firefighting training area, transport of the CPCs via surface water runoff may have been a more significant means of contaminant transport. Because training pits were open to rainfall during their operation, it is possible that intense precipitation could have caused the pits to overflow. Transport of the CPCs via surface water runoff is not considered important now that the site is inactive and vegetated.

Sediment. The transport of sediment at Site 17 by the action of humans is not currently a significant transport mechanism because very little human activity occurs in the grassy field. Transport of sediment in water during heavy rain events (by saltation, traction, and suspension) is not a likely means of sediment transport at Site 17.

Groundwater. As discussed in Section 5.5, the observed concentrations of the inorganics in unfiltered groundwater at Site 17 were affected by turbidity in the groundwater samples at the time of collection. The groundwater samples collected in 1996 (during Phase IIB) are thought to be more representative of groundwater conditions at Site 17. It is probable that particulate material of larger than colloidal sizes does not easily move through the matrix of the aquifer. Colloid-sized material may be transported through the aquifer matrix at flow rates present in the surficial aquifer system at Site 17.

Hydrogeology at Site 17 is discussed in Section 5.2 of this report. The aquifer present at the site is the surficial (sand-and-gravel) aquifer. The CPCs identified for groundwater are associated with the surficial aquifer system. Recharge of the surficial aquifer at Site 17 occurs primarily by rainfall on the site and north of the site. Groundwater flow direction in the surficial aquifer at Site 17 is primarily to the south-southwest. Clear Creek acts as a point of discharge approximately 7,000 feet southwest of the site.

Hydraulic data from the well cluster (WHF17-1 and WHF17-1S) indicate that vertical gradient in the general area is downward. Another hydraulically connected well pair (WHF1-1 and WHF1-1S) also indicates a downward gradient. The upper (approximately) 100 feet of material is sand with varying amounts of silt and clay and should probably act as a single hydraulic unit.

It is important to note that the presence of upward or downward vertical hydraulic gradients does not mean that flow is actually occurring, only that flow, if it were to occur, would be primarily in a horizontal direction with an upward or downward component. Lithologies present at a site, such as clay or clayey sands, may retard the vertical flow. Vertical hydraulic gradients should be viewed as indicative of a potential, not necessarily an actual, transport route.

Horizontal hydraulic gradient estimates have been developed for the Site 17 area. The gradient was calculated for eight separate periods between September 1993 and November 1996 and averaged for each period (Table 5-2). The average hydraulic gradient in the surficial aquifer for all eight periods is 0.0039 ft/ft in a south-southwest direction.

Testing completed on nearby monitoring wells WHF1-1S, WHF-2-1, and WHF-17-2 provides an average hydraulic conductivity value for the area to the north and west of 11.43 ft/day, although the data from Site 17 indicate a somewhat lower conductivity (Table 5-4).

Horizontal groundwater seepage velocity calculations have been completed for the surficial aquifer system at Site 17 using available hydraulic information (Section 5.2). A seepage velocity of 62 feet per year was calculated using the horizontal gradient 0.0049 ft/ft, the average hydraulic conductivity (11.43 ft/day) from monitoring wells located in Sites 1, 2, and 17, (Table 5-5), and an estimated effective porosity of 0.35. Disposal activities at Site 17 may have begun releasing contaminants to the aquifer approximately 50 years ago. Using the seepage velocity calculated above and a 50-year time frame, the total distance of potential contaminant migration was estimated to be approximately 3,100 feet.

The calculated estimate of 3,100 feet of migration relies on hydraulic conductivity values derived from slug test data from Site 17 and nearby Sites 1 and 2. Slug tests provide a rough estimate of hydraulic conductivity that can be more accurately measured using pumping tests. If the hydraulic conductivity value used in the calculation were decreased by an order of magnitude, a total migration of only 310 feet would be expected for the 50-year history of the site.

Clear Creek is the final point of discharge for groundwater from the surficial aquifer at Site 17. Clear Creek is located approximately 7,000 feet southwest of Site 17. The results of surface water and sediment sampling are presented in Technical Memorandum No. 4, Surface Water and Sediments, May 1992 (ABB-ES, 1992b) and will also be presented in the future RI report for Site 39, Clear Creek Flood Plain.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSIONS. The following is a summary based on the RI at Site 17, Crash Crew Training Area, NAS Whiting Field:

- Organic analytes detected in surface soil samples consist of seven VOCs, four SVOCs, and TRPH. Five VOCs (ethylbenzene, methylene chloride, toluene, trichloroethene, and total xylenes) and one SVOC (naphthalene) exceeded Chapter 62-777, FAC, leachability SCTLs. All of the VOCs and SVOCs detected were below the State and Federal residential and industrial target levels. TRPH exceeded the Chapter 62-777, FAC, residential, industrial, and leachability SCTLs. No pesticides or PCBs were detected in the surface soil sample collected from Site 17.
- Twenty TAL inorganics were detected in the surface soil samples. Ten analytes (aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, manganese and vanadium) exceeded either the USEPA Region III residential soil or Chapter 62-777, FAC, residential and leachability SCTLs.
- Organic analytes detected in subsurface soil samples consist of three VOCs, two SVOCs, and two pesticides and/or PCBs. No VOCs, SVOCs, pesticides, or PCBs exceeded Florida or Federal residential or industrial screening criteria.
- TRPH was detected in 4 of 19 subsurface soil samples and in no duplicates. None of the samples exceeded the Chapter 62-777, FAC, industrial and leachability SCTLs of 2,500 mg/kg and 340 mg/kg, respectively, for residential screening criteria (350 mg/kg).
- Twenty-three inorganic analytes were detected in the subsurface soil samples. Three inorganics (arsenic, chromium, and iron) exceeded USEPA Region III industrial RBCs or Chapter 62-777, FAC, industrial and leachability SCTLs. Arsenic was detected in four subsurface soil samples at concentrations that exceeded State and Federal industrial screening criteria. Eighteen subsurface soil samples exceeded the residential Florida soil cleanup goals for arsenic.
- Chromium exceeded the Chapter 62-777, FAC, leachability SCTL of 38 mg/kg in four subsurface soil samples. Chromium was not detected in any of the subsurface soil samples above the USEPA Region III industrial soil RBC of 610 mg/kg (calculated using a noncancer hazard quotient of 0.1) or the Chapter 62-777, FAC, industrial SCTL of 430 mg/kg.
- One VOC, carbon disulfide, was detected in one sample (17G00301) at an estimated 2 µg/l. No SVOCs, pesticides, or PCBs were detected in groundwater samples collected from monitoring wells WHF-17-1, WHF-17-1S, WHF-17-2, or WHF-17-3 during phase IIB.
- Seventeen inorganic analytes, including aluminum, barium, beryllium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc were detected in groundwater samples collected from monitoring wells (WHF-17-1, WHF-17-

1S, WHF-17-2 and WHF-17-3). Two inorganics, aluminum and iron, collected in July 1997 had concentrations that exceeded either residential Florida groundwater guidance or Federal MCLs.

- The HHCPCs detected in surface soil do not pose unacceptable carcinogenic risks to the receptors evaluated based on USEPA risk criteria.
- The HHCPCs detected in subsurface soil and groundwater do not pose unacceptable carcinogenic risks to the receptors evaluated based on USEPA and FDEP risk criteria.
- The total ELCR at Site 17, associated with ingestion of soil by a hypothetical future resident, exceeds Florida's target risk level of concern 1×10^{-6} due primarily to arsenic.
- The surface soil carcinogenic risks at Site 17 are driven by arsenic. The arsenic in site soil appears to be at naturally occurring levels. The arsenic EPC for surface soil was 2.8 mg/kg, which is below the background screening value of 3.6 mg/kg. This indicates that risks for exposures to arsenic in background (nonsite) soils are actually higher than risk from possible exposure to arsenic at Site 17 soils.
- Noncancer risk levels for soil, subsurface soil, and groundwater meet the USEPA and FDEP target HI of one.
- The CT tendency risks to a hypothetical future resident meet the Florida level of concern (1×10^{-6}). CT and RME residential risks provide the risk managers and decision makers with a perspective of the true hypothetical risk range to future residents.
- Sublethal risks (i.e., potential reductions in the reproduction and growth of terrestrial wildlife) associated with the ingestion of cadmium in surface soil and food items are predicted for small mammals and birds at Site 17.
- Although RME concentrations of cadmium and lead exceeded their respective benchmark values, CT exposure concentrations of these constituent were below the benchmark values. In addition, no evidence of stressed vegetation outside of the burn pits was observed at Site 17. Therefore, it is unlikely that plant cover and/or biomass at Site 17 would be reduced such that small mammals and birds would be affected.
- Reduction in invertebrate biomass across the entire Site 17 area is not expected to occur.
- Only sublethal risks associated with ingestion of cadmium in surface soil and food items are predicted for small mammals and birds at Site 17.

In February 1999, BEI completed a time-critical IRA at Site 17. The objective of the IRA was to reduce the arsenic and the total recoverable petroleum hydrocarbons (TRPH) exposure risk to potential industrial or residential receptors at the site. The IRA consisted of the placement of a permeable soil layer and vegetative cover over areas where surface soil arsenic and TRPH concentrations

exceeded the Florida Department of Environmental Protection (FDEP) industrial soil cleanup target levels (SCTLs).

9.2 RECOMMENDATIONS. Based on the interpretation of findings from the RI activities, a focused feasibility study is recommended to address potential risk of a surface soil exposure by a hypothetical future aggregate resident. The calculated risk to a hypothetical resident (2×10^{-6}) exceeded Florida's target level due to arsenic.

Although groundwater analytical results, summaries, and conclusions are included in this RI report, the groundwater at NAS Whiting Field has been designated as a separate site (Site 40, Facilitywide Groundwater). Therefore, chemicals in the groundwater that pose a threat to human and/or ecological receptors will be evaluated as part of the Site 40 RI/FS. The Site 40 assessment will supersede the evaluation presented in this report.

10.0 PROFESSIONAL REVIEW CERTIFICATION

The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applied standards of practice. This report is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. The RI for Site 17, Crash Crew Training Area, was developed for NAS Whiting Field in Milton, Florida, and should not be construed to apply for any other purpose or to any other site.



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APPENDIX A
QUALITY CONTROL DATA

APPENDIX A

**Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables**

Draft Version

12/12/97

APPENDIX A

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SDG#: WF022		VALIDATION SAMPLE TABLE							LDC#: 1932A
Project Name: NAS Whiting Field		Parameters/Analytical Method							Job#: 8532-20
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
BKT01001	RB858001	TB	water	7-16-96	X				
BKR01001	RB858002	R	water	7-16-96	X	X	X	X	X
BKG00101	RB858003		water	7-16-96	X	X	X	X	X
BKG00101D	RB858004	FD	water	7-16-96	X	X	X	X	X
BKG00102	RB858005		water	7-16-96	X	X	X	X	X
BKG00102F	RB858006		water	7-16-96				X	
BKG00103	RB858007		water	7-16-96	X	X	X	X	X
BKG00202	RB858008		water	7-17-96	X	X	X	X	X
BKG00201	RB858009		water	7-17-96	X	X	X	X	X
BKF01001	RB858010	SB	water	7-17-96	X	X	X	X	X
17T01101	RB873001	TB	water	7-18-96	X				
17G00102	RB873002		water	7-18-96	X	X	X	X	X
17G00101	RB873003		water	7-18-96	X	X	X	X	X
17G00201	RB873004		water	7-18-96	X	X	X	X	X
17G00301	RB873005		water	7-18-96	X	X	X	X	X
17G00201F	RB873006		water	7-18-96				X	
01G00101	RB873007		water	7-19-96	X	X	X	X	X
01G00102	RB873008		water	7-19-96	X	X	X	X	X
01G00102D	RB873009		water	7-19-96	X	X	X	X	X
BKG00101MS	RB858003MS	MS	water	7-16-96	X	X	X	X	X
BKG00101MSD	RB858003MSD	MSD	water	7-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF023		VALIDATION SAMPLE TABLE							LDC#: 1942A	
Project Name: NAS Whiting Field		Parameters/Analytical Method							Job #: 8532-20	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide	
01T01201	RB887001	TB	water	7-22-96	X					
01G00401	RB887002		water	7-22-96	X	X	X	X	X	
01G00201	RB887003		water	7-22-96	X	X	X	X	X	
01G00201F	RB887004		water	7-22-96				X		
01R01101	RB887005	R	water	7-23-96	X	X	X	X	X	
01G00301	RB887006		water	7-23-96	X	X	X	X	X	
BKG00301	RB887007		water	7-23-96	X	X	X	X	X	
02G00201	RB887008		water	7-23-96	X	X	X	X	X	
02G00101	RB887009		water	7-23-96	X	X	X	X	X	
02G00101F	RB887010		water	7-23-96				X		
18G00301	RB887011		water	7-24-96	X	X	X	X	X	
02G00301	RB887012		water	7-24-96	X	X	X	X	X	
02G00301D	RB887013	FD	water	7-24-96	X	X	X	X	X	
16T01301	RB887014		water	7-25-96	X					
16G00701	RB887015		water	7-25-96	X	X	X	X	X	
16G00702	RB887016		water	7-25-96	X	X	X	X	X	
16G00702DL	RB887016DL		water	7-25-96	X					
16G00703	RB887017		water	7-25-96	X	X	X	X	X	
16G00703DL	RB887017DL		water	7-25-96	X					
18G00201	RB887018		water	7-26-96	X	X	X	X	X	
02G00301MS	RB887012MS	MS	water	7-24-96	X	X	X	X	X	
02G00301MSD	RB887012MSD	MSD	water	7-24-96	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP ~ Duplicate

SDG#: WF024		VALIDATION SAMPLE TABLE							LDC#: 1943A	
Project Name: NAS Whiting Field		Parameters/Analytical Method							Job#: 8532-20	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide	
18T01401	RB920001	TB	water	7-29-96	X					
18G00101	RB920002		water	7-29-96	X	X	X	X	X	
15G00401	RB920003		water	7-30-96	X	X	X	X	X	
BKG00203	RB920004		water	7-30-96	X	X	X	X	X	
15R01201	RB920005	R	water	7-31-96	X	X	X	X	X	
BKG00203F	RB920006		water	7-30-96				X		
15G00702	RB920007		water	7-31-96	X	X	X	X	X	
15G00702F	RB920008		water	7-31-96				X		
15G00701	RB920009		water	7-31-96	X	X	X	X	X	
15G00701D	RB920010	FD	water	7-31-96	X	X	X	X	X	
15G00701MS	RB920009MS	MS	water	7-31-96	X	X	X	X	X	
15G00701MSD	RB920009MSD	MSD	water	7-31-96	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF025		VALIDATION SAMPLE TABLE							LDC#: 1956A	
Project Name: NAS Whiting Field					Parameters/Analytical Method					Job#: 8532-20
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide	
15T01501	RB956001	TB	water	8-5-96	X					
15G00703	RB956002		water	8-5-96	X	X	X	X	X	
15G00503	RB956003		water	8-6-96	X	X	X	X	X	
15G00503DL	RB956003DL		water	8-6-96	X					
15G00502	RB956004		water	8-6-96	X	X	X	X	X	
15G00501	RB956005		water	8-6-96	X	X	X	X	X	
15G00601	RB956006		water	8-7-96	X	X	X	X	X	
15G00603	RB956007		water	8-7-96	X	X	X	X	X	
15G00601D	RB956008	FD	water	8-7-96	X	X	X	X	X	
15G00503F	RB956009		water	8-6-96					X	
15G00501F	RB956010		water	8-6-96					X	
15R01301	RB956011	R	water	8-7-96	X	X	X	X	X	
15T01601	RB956012	TB	water	8-8-96	X					
15G00301	RB956013		water	8-8-96	X	X	X	X	X	
15G00302	RB956014		water	8-8-96	X	X	X	X	X	
15G00303	RB956015		water	8-9-96	X	X	X	X	X	
15G00101	RB956016		water	8-8-96	X	X	X	X	X	
15G00203	RB956017		water	8-9-96	X	X	X	X	X	
15G00301F	RB956018		water	8-8-96					X	
15G00203F	RB956019		water	8-9-96					X	
15G00601MS	RB956006MS	MS	water	8-7-96	X	X	X	X	X	
15G00601MSD	RB956006MSD	MSD	water	8-7-96	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF026

VALIDATION SAMPLE TABLE

LDC#: 1957A

Project Name: NAS Whiting Field

Parameters/Analytical Method

Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
15T01701	RB980001	TB	water	8-12-96	X				
15G00202	RB980002		water	8-12-96	X	X	X	X	X
15G00201	RB980003		water	8-13-96	X	X	X	X	X
15G00802	RB980004		water	8-13-96	X	X	X	X	X
15G00802R	RB980004R		water	8-13-96		X			
15G00801	RB980005		water	8-13-96	X	X	X	X	X
16G00201	RB980006		water	8-14-96	X	X	X	X	X
15G00803	RB980007		water	8-14-96	X	X	X	X	X
16G00803D	RB980008	FD	water	8-14-96	X	X	X	X	X
15G00202F	RB980009		water	8-12-96				X	
15G00201F	RB980010		water	8-13-96				X	
15G00802F	RB980011		water	8-13-96				X	
15R01401	RB980012	R	water	8-14-96	X	X	X	X	X
15G00803F	RB980013		water	8-14-96				X	
16G00201F	RB980014		water	8-14-96				X	
16T01801	RB980015	TB	water	8-15-96	X				
16G00202	RB980016		water	8-15-96	X	X	X	X	X
16G00202DL	RB980016DL		water	8-15-96	X				
16G00203	RB980017		water	8-15-96	X	X	X	X	X
16G00602	RB980018		water	8-15-96	X	X	X	X	X
16G00601	RB980019		water	8-16-96	X	X	X	X	X
16G00403	RB980020		water	8-16-96	X	X	X	X	X
16G00403DL	RB980020DL		water	8-16-96	X				
16G00403D	RB980021		water	8-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP -- Duplicate

Table 1

SDG#: WF026		VALIDATION SAMPLE TABLE						LDC#: 1957A	
Project Name: NAS Whiting Field					Parameters/Analytical Method				Job#: 8532-20
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
16G00403DDL	RB980021DL		water	8-16-96	X				
16G00601F	RB980022		water	8-16-96				X	
16G00403F	RB980023		water	8-16-96				X	
15G00803MS	RB980007MS	MS	water	8-14-96	X	X	X	X	X
15G00803MSD	RB980007MSD	MSD	water	8-14-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF025	VALIDATION SAMPLE TABLE					LDC#: 1970A
Project Name: NAS Whiting Field	Parameters/Analytical Method					Job#: 8532-20
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	Pesticides/PCBs	
15G00502RE	RB956004RE		water	8-6-96	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF027		VALIDATION SAMPLE TABLE							LDC#: 1970B	
Project Name: NAS Whiting Field					Parameters/Analytical Method					Job#: 8532-20
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide	
16T01901	RC016001	TB	water	8-19-96	X					
16G00401	RC016002		water	8-19-96	X	X	X	X	X	
16G00402	RC016003		water	8-19-96	X	X	X	X	X	
16G00101	RC016004		water	8-19-96	X	X	X	X	X	
16G00301	RC016005		water	8-20-96	X	X	X	X	X	
16G00302	RC016006		water	8-20-96	X	X	X	X	X	
16G00304	RC016007		water	8-20-96	X	X	X	X	X	
16G00303	RC016008		water	8-21-96	X	X	X	X	X	
16G00501	RC016009		water	8-21-96	X	X	X	X	X	
16G00303F	RC016010		water	8-21-96				X		
16G00501F	RC016011		water	8-21-96				X		
16R01501	RC016012	R	water	8-21-96	X	X	X	X	X	
16G00501D	RC016013	FD	water	8-21-96	X	X	X	X	X	
66T02001	RC016014	TB	water	8-22-96	X					
66G02101	RC016015		water	8-22-96	X	X	X	X	X	
66G02103	RC016016		water	8-22-96	X	X	X	X	X	
66G02102	RC016017		water	8-22-96	X	X	X	X	X	
09G00101	RC016018		water	8-23-96	X	X	X	X	X	
09G00301	RC016019		water	8-23-96	X	X	X	X	X	
09G00301D	RC016020	FD	water	8-23-96	X	X	X	X	X	
66G02102F	RC016021		water	8-23-96				X		
09G00301F	RC016022		water	8-23-96				X		
16G00501MS	RC016009MS	MS	water	8-21-96	X	X	X	X	X	
16G00501MSD	RC016009MSD	MSD	water	8-21-96	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF028

VALIDATION SAMPLE TABLE

LDC#: 1974A

Project Name: NAS Whiting Field

Parameters/Analytical Method

Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
10T02101	RC044001	TB	water	8-26-96	X				
09G00201	RC044002		water	8-26-96	X	X	X	X	X
10G00101	RC044003		water	8-26-96	X	X	X	X	X
10G00201	RC044004		water	8-26-96	X	X	X	X	X
11G00402	RC044005		water	8-26-96	X	X	X	X	X
11G00102	RC044006		water	8-27-96	X	X	X	X	X
11G00401	RC044007		water	8-27-96	X	X	X	X	X
11T02201	RC044008	TB	water	8-28-96	X				
11G00301	RC044009		water	8-28-96	X	X	X	X	X
11G00101	RC044010		water	8-28-96	X	X	X	X	X
11G00201	RC044011		water	8-28-96	X	X	X	X	X
12G00101	RC044012		water	8-27-96	X	X	X	X	X
12G00201	RC044013		water	8-27-96	X	X	X	X	X
11G00201F	RC044014		water	8-28-96				X	
11G00301F	RC044015		water	8-28-96				X	
11R01601	RC044016		water	8-28-96	X	X	X	X	X
12G00101D	RC044017	FD	water	8-27-96	X	X	X	X	X
11G00201D	RC044018	FD	water	8-28-96	X	X	X	X	X
12G00101MS	RC044012MS	MS	water	8-27-96	X	X	X	X	X
12G00101MSD	RC044012MSD	MSD	water	8-27-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF029		VALIDATION SAMPLE TABLE							LDC#: 1989A	
Project Name: NAS Whiting Field			Parameters/Analytical Method						Job#: 8532-20	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide	
13T02301	RC092001	TB	water	9-9-96	X					
13G00101	RC092002		water	9-9-96	X	X	X	X	X	
13G00102	RC092003		water	9-9-96	X	X	X	X	X	
13G00201	RC092004		water	9-10-96	X	X	X	X	X	
13G00103	RC092005		water	9-10-96	X	X	X	X	X	
14G00201	RC092006		water	9-10-96	X	X	X	X	X	
14G00101	RC092007		water	9-11-96	X	X	X	X	X	
13R01701	RC092008	R	water	9-11-96	X	X	X	X	X	
14G00101D	RC092009	FD	water	9-11-96	X	X	X	X	X	
13G00103F	RC092010		water	9-10-96					X	
66T02401	RC092011	TB	water	9-12-96	X					
66G00901	RC092012		water	9-12-96	X	X	X	X	X	
66G00904	RC092013		water	9-12-96	X	X	X	X	X	
66G00902	RC092014		water	9-13-96	X	X	X	X	X	
66G00903	RC092015		water	9-13-96	X	X	X	X	X	
66G00903F	RC092016		water	9-13-96					X	
14G00101MS	RC092007MS	MS	water	9-11-96	X	X	X	X	X	
14G00101MSD	RC092007MSD	MSD	water	9-11-96	X	X	X	X	X	

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF030		VALIDATION SAMPLE TABLE							LDC#: 2000A	
Project Name: NAS Whiting Field					Parameters/Analytical Method					Job#: 8532-20
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide	
66T02501	RC121001	TB	water	9-16-96	X					
66G00801	RC121002		water	9-16-96	X	X	X	X	X	
66G00802	RC121003		water	9-16-96	X	X	X	X	X	
66G00803	RC121004		water	9-17-96	X	X	X	X	X	
66G00804	RC121005		water	9-17-96	X	X	X	X	X	
66G00602	RC121006		water	9-17-96	X	X	X	X	X	
66G00601	RC121007		water	9-18-96	X	X	X	X	X	
66G00603	RC121008		water	9-18-96	X	X	X	X	X	
66G00804F	RC121009		water	9-17-96				X		
66R01801	RC121010		water	9-18-96	X	X	X	X	X	
66G00601D	RC121011	FD	water	9-18-96	X	X	X	X	X	
66T02601	RC121012	TB	water	9-19-96	X					
66G00604	RC121013		water	9-19-96	X	X	X	X	X	
66G02201	RC121014		water	9-19-96	X	X	X	X	X	
66G02202	RC121015		water	9-19-96	X	X	X	X	X	
66G02203	RC121016		water	9-20-96	X	X	X	X	X	
66G02203D	RC121017	FD	water	9-20-96	X	X	X	X	X	
66G00601MS	RC121007MS	MS	water	9-18-96	X	X	X	X	X	
66G00601MSD	RC121007MSD	MSD	water	9-18-96	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF031		VALIDATION SAMPLE TABLE							LDC#: 2031A
Project Name: NAS Whiting Field				Parameters/Analytical Method					Job#: 8532-20
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
05T02701	MB928001	TB	water	9-23-96	X				
05G00801	MB928002		water	9-23-96	X	X	X	X	X
05G00802	MB928003		water	9-23-96	X	X	X	X	X
05G00901	MB928004		water	9-24-96	X	X	X	X	X
05G00902	MB928005		water	9-24-96	X	X	X	X	X
05G01002	MB928006		water	9-24-96	X	X	X	X	X
05G01001	MB928007		water	9-25-96	X	X	X	X	X
05G00301	MB928008		water	9-25-96	X	X	X	X	X
05G00301RE	MB928008RE		water	9-25-96		X			
05G00801F	MB928009		water	9-23-96				X	
05G00902F	MB928010		water	9-24-96				X	
05R01901	MB928011	R	water	9-25-96	X	X	X	X	X
05G01001D	MB928012	FD	water	9-25-96	X	X	X	X	X
33T02801	MB958001	TB	water	9-26-96	X				
05G00101	MB958002		water	9-26-96	X	X	X	X	X
33G00501	MB958003		water	9-26-96	X	X	X	X	X
33G00201	MB958004		water	9-26-96	X	X	X	X	X
33G00101	MB958005		water	9-27-96	X	X	X	X	X
33G00301	MB958006		water	9-27-96	X	X	X	X	X
33G00301D	MB958007	FD	water	9-27-96	X	X	X	X	X
05G01001MS	MB928007MS	MS	water	9-25-96	X	X	X	X	X
05G01001MSD	MB928007MSD	MSD	water	9-25-96	X	X	X		
05G01001DUP	MB928007DUP	DUP	water	9-25-96				X	X

TP = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF031B

VALIDATION SAMPLE TABLE

LDC#: 2121A

Project Name: NAS Whiting Field

Parameters/Analytical Method

Job#: 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals (CLP-2.1)	Cyanide
05G01002	MC447001		water	11-21-96	X	X	X	X	X
16T04001	MC447002	TB	water	11-21-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF032		VALIDATION SAMPLE TABLE							LDC#: 2046A	
Project Name: NAS Whiting Field		Parameters/Analytical Method							Job#: 8532-20	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide	
06T02901	MC011001	TB	water	9-30-96	X					
33G00401	MC011002		water	9-30-96	X	X	X	X	X	
06G00102	MC011003		water	10-1-96	X	X	X	X	X	
06G00101	MC011004		water	10-1-96	X	X	X	X	X	
06G00301	MC011005		water	10-2-96	X	X	X	X	X	
06R02001	MC011006	R	water	10-2-96	X	X	X	X	X	
29G00501	MC011007		water	10-2-96	X	X	X	X	X	
29G00501D	MC011008	FD	water	10-2-96	X	X	X	X	X	
29T03001	MC037001	TB	water	10-3-96	X					
29G00101	MC037002		water	10-3-96	X	X	X	X	X	
66G01201	MC037003		water	10-3-96	X	X	X	X	X	
66G00102	MC037004		water	10-4-96	X	X	X	X	X	
29G00501MS	MC011007MS	MS	water	10-2-96	X	X	X	X	X	
29G00501MSD	MC011007MSD	MSD	water	10-2-96	X	X	X			
29G00501DUP	MC011007DUP	DUP	water	10-2-96				X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF033		VALIDATION SAMPLE TABLE							LDC #: 2069A	
Project Name: NAS Whiting Field				Parameters/Analytical Method					Job #: 8532-20	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide	
29T03101	MC085001	TB	water	10-7-96	X					
26G00401	MC085002		water	10-7-96	X	X	X	X	X	
26G00301	MC085003		water	10-8-96	X	X	X	X	X	
66G00202	MC085004		water	10-8-96	X	X	X	X	X	
29G00201	MC085005		water	10-8-96	X	X	X	X	X	
66G01901	MC085006		water	10-9-96	X	X	X	X	X	
66R02101	MC085007	R	water	10-9-96	X	X	X	X	X	
66T03201	MC118001	TB	water	10-10-96	X					
66G00201	MC118002		water	10-9-96	X	X	X	X	X	
66G00201D	MC118003	FD	water	10-9-96	X	X	X	X	X	
07G00101	MC118004		water	10-10-96	X	X	X	X	X	
30G00501	MC118005		water	10-10-96	X	X	X	X	X	
66G00301	MC118006		water	10-11-96	X	X	X	X	X	
66G00201MS	MC118002MS	MS	water	10-9-96	X	X	X	X	X	
66G00201MSD	MC118002MSD	MSD	water	10-9-96	X	X	X			
66G00201DUP	MC118002DUP	DUP	water	10-9-96				X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP -- Duplicate

Table 1

SDG#: WF034		VALIDATION SAMPLE TABLE							LDC#: 2070A	
Project Name: NAS Whiting Field					Parameters/Analytical Method				Job #: 8532-20	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide	
66T03301	MC153001	TB	water	10-14-96	X					
66G02001	MC153002		water	10-14-96	X	X	X	X	X	
66G00302	MC153003		water	10-15-96	X	X	X	X	X	
66G01801	MC153004		water	10-16-96	X	X	X	X	X	
30G00301	MC153005		water	10-16-96	X	X	X	X	X	
30G00401	MC153006		water	10-16-96	X	X	X	X	X	
66R02201	MC153007	R	water	10-16-96	X	X	X	X	X	
30G00301D	MC153008	FD	water	10-16-96	X	X	X	X	X	
66T03401	MC176001	TB	water	10-17-96	X					
66G01101	MC176002		water	10-17-96	X	X	X	X	X	
66G01301	MC176003		water	10-17-96	X	X	X	X	X	
66G00501	MC176004		water	10-18-96	X	X	X	X	X	
66G00501F	MC176005		water	10-18-96				X		
30G00301MS	MC153005MS	MS	water	10-16-96	X	X	X	X	X	
30G00301MSD	MC153005MSD	MSD	water	10-16-96	X	X	X			
30G00301DUP	MC153005DUP	DUP	water	10-16-96				X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF035

VALIDATION SAMPLE TABLE

LDC#: 2076A

Project Name: NAS Whiting Field

Parameters/Analytical Method

Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
66T03501	MC214001	TB	water	10-21-96	X				
66G00401	MC214002		water	10-21-96	X	X	X	X	X
66G01601	MC214003		water	10-22-96	X	X	X	X	X
66G01501	MC214004		water	10-22-96	X	X	X	X	X
66G01701	MC214005		water	10-23-96	X	X	X	X	X
66R02301	MC214006	R	water	10-23-96	X	X	X	X	X
66G01701D	MC214007	FD	water	10-23-96	X	X	X	X	X
66T03601	MC231001	TB	water	10-24-96	X				
66G00101	MC231002		water	10-24-96	X	X	X	X	X
08G00101	MC231003		water	10-24-96	X	X	X	X	X
66G01001	MC231004		water	10-25-96	X	X	X	X	X
66G01701MS	MC214005MS	MS	water	10-23-96	X	X	X	X	X
66G01701MSD	MC214005MSD	MSD	water	10-23-96	X	X	X		
66G01701DUP	MC214005DUP	DUP	water	10-23-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF036		VALIDATION SAMPLE TABLE							LDC#: 2077A	
Project Name: NAS Whiting Field				Parameters/Analytical Method					Job#: 8532-20	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide	
66T03701	MC262001	TB	water	10-28-96	X					
66G00701	MC262002		water	10-29-96	X	X	X	X	X	
54G00201	MC262003		water	10-29-96	X	X	X	X	X	
54G00101	MC262004		water	10-30-96	X	X	X	X	X	
31G00201	MC262005		water	10-30-96	X	X	X	X	X	
31G00201F	MC262006		water	10-30-96				X		
54R02401	MC262007	R	water	10-30-96	X	X	X	X	X	
54G00101D	MC262008	FD	water	10-30-96	X	X	X	X	X	
31T03801	MC284001	TB	water	10-31-96	X					
31G00301	MC284002		water	10-31-96	X	X	X	X	X	
31G00402	MC284003		water	10-31-96	X	X	X	X	X	
31G00403	MC284004		water	11-1-96	X	X	X	X	X	
54G00101MS	MC262004MS	MS	water	10-30-96	X	X	X	X	X	
54G00101MSD	MC262004MSD	MSD	water	10-30-96	X	X	X			
54G00101DUP	MC262004DUP	DUP	water	10-30-96				X	X	

TR = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF037

VALIDATION SAMPLE TABLE

LDC#: 2071A

Project Name: NAS Whiting Field

Parameters/Analytical Method

Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
15T03901	MC424001	TB	water	11-18-96	X				
15G00502	MC424002		water	11-18-96	X				
15G00503	MC424003		water	11-18-96	X				
16G00202	MC424004		water	11-19-96	X				
16G00203	MC424005		water	11-19-96	X				
15G00802	MC424006		water	11-20-96	X				
15G00803	MC424007		water	11-20-96	X				
15G00803D	MC424008	FD	water	11-20-96	X				
15R02501	MC424009	R	water	11-20-96	X				
15F00201	MC424010		water	11-20-96	X	X	X	X	X
16G00702	MC448001		water	11-21-96	X				
16G00703	MC448002		water	11-21-96	X				
16G00403	MC448003		water	11-22-96	X				
16T04001	MC448004	TB	water	11-21-96	X				
15G00803MS	MC424007MS	MS	water	11-20-96	X				
15G00803MSD	MC424007MSD	MSD	water	11-20-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF038					VALIDATION SAMPLE TABLE	LDC#: 2099A
Project Name: NAS Whiting Field					Parameters/Analytical Method	Job #: 7560-32
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	
36T04101	MC687001	TB	water	12-17-96		X
36BO0101	MC687002		soil	12-17-96		X
36BO0102	MC687003		soil	12-17-96		X
36BO0103	MC687004		soil	12-17-96		X
36BO0201	MC687005		soil	12-17-96		X
36BO0202	MC687006		soil	12-17-96		X
36BO0203	MC687007		soil	12-17-96		X
36BO0301	MC687008		soil	12-17-96		X
36BO0302	MC687009		soil	12-17-96		X
36BO0303	MC687010		soil	12-17-96		X
36BO0303D	MC687011	FD	soil	12-17-96		X
36BO0401	MC687012		soil	12-18-96		X
36BO0401DL	MC687012DL		soil	12-18-96		X
36BO0402	MC687013		soil	12-18-96		X
36BO0403	MC687014		soil	12-18-96		X
36BO0403D	MC687015	FD	soil	12-18-96		X
36RO2601	MC687016	R	water	12-18-96		X
36BO0303MS	MC687011MS	MS	soil	12-17-96		X
36BO0303MSD	MC687011MSD	MSD	soil	12-17-96		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF039

VALIDATION SAMPLE TABLE

LDC#: 2102A

Project Name: NAS Whiting Field

Parameters/Analytical Method

Job#: 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
35TO4201	MC698001	TB	water	12-19-96	X
35BO0101	MC698002		soil	12-20-96	X
35BO0102	MC698003		soil	12-20-96	X
35BO0102DL	MC698003DL		soil	12-20-96	X
35BO0103	MC698004		soil	12-20-96	X
35BO0104	MC698005		soil	12-20-96	X
35BO0105	MC698006		soil	12-20-96	X
35BO0106	MC698007		soil	12-21-96	X
35BO0201	MC698008		soil	12-21-96	X
35BO0202	MC698009		soil	12-21-96	X
35BO0203	MC698010		soil	12-21-96	X
35RO2701	MC698011	R	water	12-21-96	X
35BO0301	MC698012		soil	12-21-96	X
35BO0302	MC698013		soil	12-21-96	X
35BO0303	MC698014		soil	12-21-96	X
35BO0302D	MC698015	FD	soil	12-21-96	X
35BO0203D	MC698016	FD	soil	12-21-96	X
35BO0203MS	MC698010MS	MS	soil	12-21-96	X
35BO0203MSD	MC698010MSD	MSD	soil	12-21-96	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF040		VALIDATION SAMPLE TABLE				LDC#: 2120A
Project Name: NAS Whiting Field			Parameters/Analytical Method			Job#: 7560-32
Client ID #	Lab ID #	QC Type	Matrix	Date Collected		VOA (CLP-1.9)
35TO4301	MC783001	TB	water	1-7-97		X
35BO0401	MC783002		soil	1-7-97		X
35BO0402	MC783003		soil	1-7-97		X
35BO0403	MC783004		soil	1-7-97		X
35BO0501	MC783005		soil	1-7-97		X
35BO0501DL	MC783005DL		soil	1-7-97		X
35BO0502	MC783006		soil	1-7-97		X
35BO0503	MC783007		soil	1-7-97		X
35BO0201	MC783008		soil	1-8-97		X
35BO0202	MC783009		soil	1-8-97		X
35BO0203	MC783010		soil	1-8-97		X
35BO0101	MC783011		soil	1-8-97		X
35BO0102	MC783012		soil	1-8-97		X
35BO0103	MC783013		soil	1-8-97		X
35BO0301	MC783014		soil	1-9-97		X
35BO0302	MC783015		soil	1-9-97		X
35BO0303	MC783016		soil	1-9-97		X
35R02801	MC783017	R	water	1-9-97		X
35BO0203D	MC783018	FD	soil	1-8-97		X
35BO0103D	MC783019	FD	soil	1-8-97		X
35BO0203MS	MC783010MS	MS	soil	1-8-97		X
35BO0203MSD	MC783010MSD	MSD	soil	1-8-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF041

VALIDATION SAMPLE TABLE

LDC#: 2323A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)
35T04501	MD908001	TB	water	6-11-97	X			
35F00301	MD908002		water	6-11-97	X	X	X	X
35R03001	MD908003	R	water	6-11-97	X	X	X	X
35G00101	MD908004		water	6-11-97	X	X	X	X
35G00101D	MD908005	FD	water	6-11-97	X	X	X	X
35G00101DRE	MD908005RE	FD	water	6-11-97		X		
35G00103	MD908006		water	6-11-97	X	X	X	X
35G00103F	MD908007		water	6-11-97				X
35G00102	MD908008		water	6-12-97	X	X	X	X
37G00102	MD908009		water	6-12-97	X	X	X	X
37T04601	MD926001	TB	water	6-12-97	X			
36G00101	MD926002		water	6-12-97	X	X	X	X
36G00101F	MD926003		water	6-12-97				X
37G00101	MD926004		water	6-12-97	X	X	X	X
36G00102	MD926005		water	6-13-97	X	X	X	X
36G00102RE	MD926005RE		water	6-13-97		X		
36G00103	MD926006		water	6-13-97	X	X	X	X
36G00103RE	MD926006RE		water	6-13-97		X		
35T04701	MD950001	TB	water	6-15-97	X			
35G00202	MD950002		water	6-15-97	X	X	X	X
35G00202D	MD950003	FD	water	6-15-97	X	X	X	X
35G00203	MD950004		water	6-15-97	X	X	X	X
35G00201	MD950005		water	6-16-97	X	X	X	X
35G00201F	MD950006		water	6-16-97				X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF041		VALIDATION SAMPLE TABLE							LDC#: 2323A
Project Name: NAS Whiting		Parameters/Analytical Method							
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)	
13T04801	MD985001	TB	water	6-16-97	X				
13G00301	MD985002		water	6-16-97	X	X	X	X	
13G00301F	MD985003		water	6-16-97				X	
13G00401	MD985004		water	6-16-97	X	X	X	X	
35G00101MS	MD908004MS	MS	water	6-11-97	X	X	X	X	
35G00101MSD	MD908004MSD	MSD	water	6-11-97	X	X	X		
35G00101DUP	MD908004DUP	DUP	water	6-11-97				X	

TP = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF042

VALIDATION SAMPLE TABLE

LDC# : 2311A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
05T04901	ME007001	TB	water	6-18-97	X
05G00301	ME007002		water	6-17-97	X
05G00901	ME007003		water	6-18-97	X
05G00902	ME007004		water	6-19-97	X
05G00902D	ME007005	FD	water	6-19-97	X
05R03101	ME007006	R	water	6-17-97	X
05T05001	ME021001		water	6-20-97	X
05G01001	ME021002		water	6-20-97	X
05G01002	ME021003		water	6-20-97	X
05G00902MS	ME007004MS	MS	water	6-19-97	X
05G00902MSD	ME007004MSD	MSD	water	6-19-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF043		VALIDATION SAMPLE TABLE				LDC#: 2315A
Project Name: NAS Whiting		Parameters/Analytical Method				
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	
05T05101	ME042001	TB	water	6-23-97		X
05R03201	ME042002	R	water	6-23-97		X
05G00801	ME042003		water	6-24-97		X
05G00802	ME042004		water	6-24-97		X
05G00802D	ME042005	FD	water	6-24-97		X
33T05201	ME053001	TB	water	6-24-97		X
33G00501	ME053002		water	6-24-97		X
33G00101	ME053003		water	6-24-97		X
33G00201	ME053004		water	6-25-97		X
33G00301	ME053005		water	6-25-97		X
33G00301DL	ME053005DL		water	6-25-97		X
33T05301	ME073001	TB	water	6-25-97		X
06G00102	ME073002		water	6-26-97		X
06G00301	ME073003		water	6-26-97		X
33G00401	ME073004		water	6-26-97		X
30T05401	ME087001	TB	water	6-26-97		X
07G00101	ME087002		water	6-26-97		X
07G00101D	ME087003	FD	water	6-26-97		X
30G00501	ME087004		water	6-26-97		X
30G00301	ME087005		water	6-27-97		X
30G00401	ME087006		water	6-27-97		X
05G00802MS	ME042004MS	MS	water	6-24-97		X
05G00802MSD	ME042004MSD	MSD	water	6-24-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF044		VALIDATION SAMPLE TABLE				LDC#: 2322A
Project Name: NAS Whiting			Parameters/Analytical Method			
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	
06T05501	ME100001	TB	water	6-29-97		X
06R03301	ME100002	R	water	6-29-97		X
66G00201	ME100003		water	6-29-97		X
06G00101	ME100004		water	6-29-97		X
66G00202	ME100005		water	6-30-97		X
66T05601	ME110001	TB	water	6-30-97		X
66G01201	ME110002		water	6-30-97		X
66G01201D	ME110003	FD	water	6-30-97		X
66G00102	ME110004		water	7-1-97		X
66G01301	ME110005		water	7-1-97		X
66T05701	ME133001	TB	water	7-2-97		X
66G00401	ME133002		water	7-2-97		X
66G02001	ME133003		water	7-2-97		X
66T05801	ME135001	TB	water	7-2-97		X
66G00603	ME135002		water	7-2-97		X
66G00603D	ME135003	FD	water	7-2-97		X
66G00604	ME135004		water	7-2-97		X
66G00601	ME135005		water	7-3-97		X
66G00602	ME135006		water	7-3-97		X
66G01201MS	ME110002MS	MS	water	6-30-97		X
66G01201MSD	ME110002MSD	MSD	water	6-30-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF045		VALIDATION SAMPLE TABLE							LDC#: 2345A	
Project Name: NAS Whiting				Parameters/Analytical Method						
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)	Cyanide	
OWT05901	ME149001	TB	water	7-7-97	X					
OWR03401	ME149002	R	water	7-7-97	X	X	X	X	X	
OWG00501	ME149003		water	7-8-97	X	X	X	X	X	
OWG00502	ME149004		water	7-8-97	X	X	X	X	X	
OWG00502D	ME149005	FD	water	7-8-97	X	X	X	X	X	
OWG00503	ME149006		water	7-8-97	X	X	X	X	X	
OWG00503F	ME149007		water	7-8-97				X		
OWT06001	ME159001	TB	water	7-8-97	X					
OWG00101	ME159002		water	7-9-97	X	X	X	X	X	
OWG00101RE	ME159002RE		water	7-9-97		X				
OWG00102	ME159003		water	7-9-97	X	X	X	X	X	
OWG00102RE	ME159003RE		water	7-9-97		X				
OWG00103	ME159004		water	7-9-97	X	X	X	X	X	
OWG00103RE	ME159004RE		water	7-9-97		X				
66T06101	ME175001	TB	water	7-9-97	X					
66G02301	ME175002		water	7-9-97	X	X	X	X	X	
66G02301RE	ME175002RE		water	7-9-97		X				
66G02302	ME175003		water	7-9-97	X	X	X	X	X	
66G02303	ME175004		water	7-10-97	X	X	X	X	X	
OWT06201	ME190001	TB	water	7-10-97	X					
OWG00302	ME190002		water	7-10-97	X	X	X	X	X	
OWG00302D	ME190003	FD	water	7-10-97	X	X	X	X	X	
OWG00303	ME190004		water	7-10-97	X	X	X	X	X	
OWG00301	ME190005		water	7-11-97	X	X	X	X	X	

*TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF045

VALIDATION SAMPLE TABLE

LDC#: 2345A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)	Cyanide
OWG00301F	ME190006		water	7-11-97				X	
OWT06401	ME226001	TB	water	7-14-97	X				
OWT06401DL	ME226001DL		water	7-14-97	X				
OWG00401	ME226002		water	7-14-97	X	X	X	X	X
OWG00201	ME226003		water	7-15-97	X	X	X	X	X
OWG00502MS	ME149004MS	MS	water	7-8-97	X	X	X	X	X
OWG00502MSD	ME149004MSD	MSD	water	7-8-97	X	X	X		
OWG00502DUP	ME149004DUP	DUP	water	7-8-97				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF046		VALIDATION SAMPLE TABLE						LDC#: 2377A	
Project Name: NAS Whiting		Parameters/Analytical Method							
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (4.0)	Cyanide
OWT06501	ME241001	TB	water	7-15-97	X				
31R03301	ME241002	R	water	7-15-97	X	X	X	X	X
31G00101	ME241003		water	7-15-97	X	X	X	X	X
31G00101D	ME241004	FD	water	7-15-97	X	X	X	X	X
OWT06601	ME261001	TB	water	7-16-97	X				
31G00401	ME261002		water	7-16-97	X	X	X	X	X
31G00402	ME261003		water	7-16-97	X				
31G00403	ME261004		water	7-16-97	X				
31G00301	ME261005		water	7-16-97	X				
31T06701	ME305001	TB	water	7-21-97	X				
31G00201	ME305002		water	7-21-97	X				
31G00101MS	ME241003MS	MS	water	7-15-97	X	X	X	X	
31G00101MSD	ME241003MSD	MSD	water	7-15-97	X	X	X		
31G00101DUP	ME241003DUP	DUP	water	7-15-97				X	

TR = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF047

VALIDATION SAMPLE TABLE

LDC #: 2346A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA OLV01.0	Metals (2.1)
39W028	ME243001		water	7-15-97	X	
39W027	ME243002		water	7-15-97	X	
39W024	ME243003		water	7-15-97	X	
39W032	ME243004		water	7-15-97	X	X
39W034	ME243005		water	7-15-97	X	X
39W034D	ME243006		water	7-15-97	X	X
39W031	ME243007		water	7-15-97	X	
STOR_BLK	ME243008		water	7-17-97	X	
39T10001	ME244001	TB	water	7-15-97	X	
39W001	ME244002		water	7-15-97	X	
39W002	ME244003		water	7-15-97	X	X
39W003	ME244004		water	7-15-97	X	
39W004	ME244005		water	7-15-97	X	
39W005	ME244006		water	7-15-97	X	
39W006	ME244007		water	7-15-97	X	
39W007	ME244008		water	7-15-97	X	
39W008	ME244009		water	7-15-97	X	
39W014	ME267001		water	7-16-97	X	
39W015	ME267002		water	7-16-97	X	
39W016	ME267003		water	7-16-97	X	X
39W012	ME267004		water	7-16-97	X	
39W012D	ME267005	FD	water	7-16-97	X	
39W013	ME267006		water	7-16-97	X	
39W017	ME267007		water	7-16-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF047		VALIDATION SAMPLE TABLE					LDC#: 2346A
Project Name: NAS Whiting						Parameters/Analytical Method	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA OLV01.0	Metals (2.1)	
STOR_BLK2	ME267008		water	7-18-97	X		
39W034MS	ME243005MS	MS	water	7-15-97	X		X
39W034MSD	ME243005MSD	MSD	water	7-15-97	X		
39W034DUP	ME243005DUP	DUP	water	7-15-97			X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF048		VALIDATION SAMPLE TABLE				LDC#: 2338A
Project Name: NAS Whiting			Parameters/Analytical Method			
Client ID #	Lab ID #	QC Type	Matrix	Date Collected		VOA (1.9)
39D002	ME245001		soil	7-15-97		X
39D001	ME245002		soil	7-15-97		X
39D007	ME245003		soil	7-15-97		X
39D023	ME264001		soil	7-16-97		X
39D026	ME264002		soil	7-16-97		X
39D016	ME264003		soil	7-16-97		X
39D013	ME264004		soil	7-16-97		X
39D019	ME264005		soil	7-17-97		X
39D018	ME264006		soil	7-17-97		X
39D018D	ME264007	FD	soil	7-17-97		X
39D022	ME264008		soil	7-17-97		X
39R03401	ME264009	R	water	7-16-97		X
39D018MS	ME264006MS	MS	soil	7-17-97		X
39D018MSD	ME264006MSD	MSD	soil	7-17-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF049		VALIDATION SAMPLE TABLE					LDC#: 2347A
Project Name: NAS Whiting						Parameters/Analytical Method	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	
39T10201	ME262001	TB	water	7-15-97	X		
39W023	ME262002		water	7-16-97	X		
39W026	ME262003		water	7-16-97	X		
39W025	ME262004		water	7-16-97	X		
39W029	ME262005		water	7-16-97	X		
39W030	ME262006		water	7-16-97	X		
39U001	ME262007		water	7-16-97	X		X
39W018	ME263001		water	7-17-97	X		
39W019	ME263002		water	7-17-97	X		
39W020	ME263003		water	7-17-97	X		
39W021	ME263004		water	7-17-97	X		
39W021D	ME263005	FD	water	7-17-97	X		
39W022	ME263006		water	7-17-97	X		
39T10401	ME263007	TB	water	7-17-97	X		
39W021MS	ME263004MS	MS	water	7-17-97	X		
39W021MSD	ME263004MSD	MSD	water	7-17-97	X		

** = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF051

VALIDATION SAMPLE TABLE

LDC#: 2360A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (CLP)
16T06801	ME306001	TB	water	7-21-97	X	
16R03501	ME306002	R	water	7-21-97	X	
16G00401	ME306003		water	7-22-97	X	
16G00401D	ME306004	FD	water	7-22-97	X	
16G00402	ME306005		water	7-22-97	X	
16G00403	ME306006		water	7-22-97	X	
16T06901	ME322001	TB	water	7-22-97	X	
16G00302	ME322002		water	7-22-97	X	X
16G00303	ME322003		water	7-22-97	X	X
16G00202	ME322004		water	7-23-97	X	X
16G00203	ME322005		water	7-23-97	X	X
16T07001	ME340001	TB	water	7-23-97	X	
16G00601	ME340002		water	7-23-97	X	X
16G00601F	ME340003		water	7-23-97		X
16G00602	ME340004		water	7-23-97	X	X
16R03601	MW340005	R	water	7-23-97		X
16G00304	ME340006		water	7-24-97	X	X
16G00304F	ME340007		water	7-24-97		X
16G00301	ME340008		water	7-24-97	X	X
16G00101	ME340009		water	7-24-97	X	X
16G00101D	ME340010	FD	water	7-24-97	X	X
16T07101	ME348001	TB	water	7-25-97	X	
16G00702	ME348002		water	7-25-97	X	X
16G00702DL	ME348002DL		water	7-25-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP - Duplicate

Table 1

SDG#: WF051		VALIDATION SAMPLE TABLE					LDC#: 2360A
Project Name: NAS Whiting		Parameters/Analytical Method					
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (CLP)	
16G00703	ME348003		water	7-25-97	X		X
16G00703DL	ME348003DL		water	7-25-97	X		
16G00701	ME348004		water	7-25-97	X		X
16G00401MS	ME306003MS	MS	water	7-22-97	X		
16G00401MSD	ME306003MSD	MSD	water	7-22-97	X		

TR = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF052		VALIDATION SAMPLE TABLE				LDC#: 2354A
Project Name: NAS Whiting						Parameters/Analytical Method
Client ID #	Lab ID #	QC Type	Matrix	Date Collected		VOA (OLV01.0)
39018	ME346001		water	7-25-97		X
39019	ME346002		water	7-25-97		X
39020	ME346003		water	7-25-97		X
39021	ME346004		water	7-25-97		X
39020D	ME346005	FD	water	7-25-97		X
39029	ME346006		water	7-25-97		X
39T10501	ME346007	TB	water	7-25-97		X
STORAGEBLK	ME346008		water	7-26-97		X
39020MS	ME346003MS	MS	water	7-25-97		X
39020MSD	ME346003MSD	MSD	water	7-25-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF053		VALIDATION SAMPLE TABLE					LDC#: 2384A
Project Name: NAS Whiting						Parameters/Analytical Method	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)	
15T07201	ME367001	TB	water	7-27-97	X		
15R03701	ME367002	R	water	7-27-97	X		X
15G00601	ME367003		water	7-27-97	X		X
15G00602	ME367004		water	7-27-97	X		X
15G00602D	ME367005	FD	water	7-27-97	X		X
15T07301	ME377001	TB	water	7-28-97	X		
15G00201	ME377002		water	7-28-97	X		X
15G00101	ME377003		water	7-28-97	X		X
15G00202	ME377004		water	7-29-97	X		X
15G00203	ME377005		water	7-29-97	X		X
15T07401	ME390001	TB	water	7-29-97	X		
15G00301	ME390002		water	7-29-97	X		X
15G00302	ME390003		water	7-29-97	X		X
15G00701	ME390004		water	7-30-97	X		X
15G00702	ME390005		water	7-30-97	X		X
15T07501	ME404001	TB	water	7-30-97	X		
15G00401	ME404002		water	7-30-97	X		X
15G00703	ME404003		water	7-30-97	X		X
15G00703D	ME404004	FD	water	7-30-97	X		X
15G00501	ME404005		water	7-31-97	X		X
15G00501F	ME404006		water	7-31-97			X
15G00502	ME404007		water	7-31-97	X		X
15G00503	ME404008		water	7-31-97	X		X
15G00602MS	ME367004MS	MS	water	7-27-97	X		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF053	VALIDATION SAMPLE TABLE					LDC#: 2384A
Project Name: NAS Whiting	Parameters/Analytical Method					
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)
15G00602MSD	ME367004MSD	MSD	water	7-27-97	X	
15G00602DUP	ME367004DUP	DUP	water	7-27-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF054		VALIDATION SAMPLE TABLE					LDC#: 2399A
Project Name: NAS Whiting			Parameters/Analytical Method				
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)	
15T07601	ME441001	TB	water	8-4-97	X		
15G00801	ME441002		water	8-4-97	X		X
15G00801D	ME441003	FD	water	8-4-97	X		X
15G00802	ME441004		water	8-4-97	X		X
15R03801	ME441005	R	water	8-5-97	X		X
15G00803	ME441006		water	8-5-97	X		X
15G00303	ME441007		water	8-5-97	X		X
30T07701	ME450001	TB	water	8-5-97	X		
30R03901	ME450002	R	water	8-6-97	X		X
30G00302	ME450003		water	8-6-97	X		X
15G00801MS	ME441002MS	MS	water	8-4-97	X		X
15G00801MSD	ME441002MSD	MSD	water	8-4-97	X		
15G00801DUP	ME441002DUP	DUP	water	8-4-97			X

T = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF055		VALIDATION SAMPLE TABLE				LDC#: 2511A
Project Name: NAS Whiting			Parameters/Analytical Method			
Client ID #	Lab ID #	QC Type	Matrix	Date Collected		VOA (1.9)
OWT08001	MF004001	TB	water	10-27-97		X
OWR04101	MF004002	R	water	10-27-97		X
OWG00401	MF004003		water	10-27-97		X
OWG00401D	MF004004		water	10-27-97		X
13R04201	MF004005	R	water	10-28-97		X
13G00401	MF004006		water	10-28-97		X
OWG00401MS	MF004003MS	MS	water	10-27-97		X
OWG00401MSD	MF004003MSD	MSD	water	10-27-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	Fraction	Sample	Compound	Reason
WF022	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF023	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF024	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF025	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF026	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF027	Volatiles Semivolatiles Pesticides & PCBs	16G00501 16G00501D 16R01501 66G02101 66G02103 66T02001 All samples All samples	2-Butanone 2-Butanone 2-Butanone 2-Butanone 2-Butanone 2-Butanone No rejected results No rejected results	Initial & Continuing Calibration (RRF)
WF028	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF029	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF030	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF031	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF031B	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF032	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples 29G00501 29G00501D	No rejected results No rejected results Heptachlor epoxide Heptachlor epoxide	Target compound identification (RT)
WF033	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF034	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF035	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	Fraction	Sample	Compound	Reason
WF036	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF037	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF038	Volatiles	All samples	No rejected results	-
WF039	Volatiles	All samples	No rejected results	-
WF040	Volatiles	All samples	No rejected results	-
WF041	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF042	Volatiles	All samples	No rejected results	-
WF043	Volatiles	All samples	No rejected results	-
WF044	Volatiles	All samples	No rejected results	-
WF045	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF046	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	-
WF047	Volatiles	39T1001 39W001 39W002 39W003 39W004 39W005 39W006 39W007 39W008 39W012 39W012D 39W013 39W014 39W015 39W016 39W017 39W024 39W027 39W028 39W031 39W032 39W034 39W034D STOR_BLK STOR_BLK2	Acetone & 2-Butanone Acetone & 2-Butanone 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone 2-Butanone 2-Butanone Acetone & 2-Butanone 2-Butanone Acetone & 2-Butanone 2-Butanone 2-Butanone	Initial & Continuing Calibration (RRF)
WF048	Volatiles	All samples	No rejected results	-

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	Fraction	Sample	Compound	Reason
WF049	Volatiles	39T10201 39T10401 39W016 39W019 39W020 39W021 39W021D 39W022 39W023 39W025 39W026 39W029 39W030	Acetone & 2-Butanone Acetone & 2-Butanone Acetone 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone 2-Butanone 2-Butanone	Initial & Continuing calibration (RRF)
WF049	Semivolatiles	All samples	No rejected results	-
WF051	Volatiles	All samples	No rejected results	-
WF052	Volatiles	39G018 39G019 39G020 39G020D 39G021 39G029 39R10501 STORAGE BLK	Acetone & 2-Butanone Acetone	Initial & Continuing Calibration (RRF)
WF053	Volatiles	All samples	No rejected results	-
WF054	Volatiles	All samples	No rejected results	-
WF055	Volatiles	All samples	No rejected results	-

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	Fraction	Sample	Analyte	Reason
WF022	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF023	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF024	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF025	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF026	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF027	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF028	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF029	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF030	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF031	All metals Cyanide	All samples 05G00101 05G00301 05G00801 05G00802 05G00901 05G00902 05G01001 05G01001D 05G01002 05R01901 33G00101 33G00201 33G00301 33G00301D 33G00501	No rejected results Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide	Matrix spike (%R)
WF031B	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF032	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF033	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF034	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF035	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF036	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF037	All metals Cyanide	All samples 15F00201	No rejected results Cyanide	Matrix spike (%R)
WF041	All metals Cyanide	All samples All samples	No rejected results No rejected results	-

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	Fraction	Sample	Analyte	Reason
WF045	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF046	All metals Cyanide	All samples All samples	No rejected results No rejected results	-
WF047	All metals	All samples	No rejected results	-
WF051	All metals	All samples	No rejected results	-
WF053	All metals	All samples	No rejected results	-
WF054	All metals	All samples	No rejected results	-

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF022	BKG00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						J (all detects)
		4-Chloro-3-methylphenol	23-97	-	108	115		J (all detects)
		4-Nitrophenol	10-80	-	88	93		J (all detects)
		2,4-Dinitrotoluene	24-96	-	100	108		J (all detects)
		Pentachlorophenol	9-103	-	106	118		J (all detects)
WF023	02G00301	Volatiles	-	-	-	-	-	None
		Semivolatiles						J (all detects)
		4-Nitrophenol	10-80	-	88	82		J (all detects)
		2,4-Dinitrotoluene	24-96	-	97	-		J (all detects)
		Pentachlorophenol	9-103	-	139	122		J (all detects)
		Pesticides/PCBs	-	-	-	-		None
WF024	15G00701	Volatiles	-	-	-	-	-	None
		Semivolatiles						J (all detects)
		4-Nitrophenol	10-80	-	100	102		J (all detects)
		2,4-Dinitrotoluene	24-96	-	102	106		J (all detects)
		Pentachlorophenol	9-103	-	147	148		J (all detects)
		Pesticides/PCBs	-	-	-	-		None
WF025	15G00601	Volatiles	-	-	-	-	-	None
		Semivolatiles						J (all detects)
		4-Nitrophenol	10-80	-	99	102		J (all detects)
		2,4-Dinitrotoluene	24-96	-	101	103		J (all detects)
		Pentachlorophenol	9-103	-	124	130		J (all detects)
		Pesticides/PCBs	-	-	-	-		None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF026	15G00803	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		4-Chloro-3-methylphenol	23-97	-	99	-	-	J (all detects)
		4-Nitrophenol	10-80	-	108	114	-	J (all detects)
		Pentachlorophenol	9-103	-	140	144	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	-	100	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF027	16G00501	Volatiles	-	-	-	-	-	J
		Benzene	-	≤11	-	-	12	
		<u>Semivolatiles</u>						
		4-Nitrophenol	10-80	-	91	91	-	J (all detects)
		Pentachlorophenol	9-103	-	104	104	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF028	12G00101	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		4-Nitrophenol	10-80	-	83	-	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF029	14G00101	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		4-Nitrophenol	10-80	-	88	91	-	J (all detects)
		Pentachlorophenol	9-103	-	-	106	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF030	66G00601	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		4-Nitrophenol	10-80	-	85	89	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF031	05G01001	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		Phenol	-	≤42	-	-	50	None
		2-Chlorophenol	-	≤40	-	-	50	None
		4-Chloro-3-methylphenol	-	≤42	-	-	51	None
		4-Nitrophenol	10-80	≤50	-	95	58	None
		Pentachlorophenol	-	≤50	-	-	52	None
		1,4-Dichlorobenzene	-	≤28	-	-	45	J
		N-Nitroso-di-n-propylamine	-	≤38	-	-	56	J
		1,2,4-Trichlorobenzene	-	≤28	-	-	41	J
		Acenaphthene	-	≤31	-	-	84	J
		2,4-Dinitrotoluene	-	≤38	-	-	52	J
		Pyrene	-	≤31	-	-	54	J
		Pesticides/PCBs	-	-	-	-	-	None
WF031B	None	Volatiles	-	-	-	-	-	-
		<u>Semivolatiles</u>	-	-	-	-	-	-
		Pesticides/PCBs	-	-	-	-	-	-
WF032	29G00501	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF033	66G00201	<u>Volatiles</u>						
		1,1-Dichloroethene	-	≤14	-	-	16	None
		<u>Semivolatiles</u>						
		4-Nitrophenol	10-80	-	-	83	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF034	30G00301	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		Acenaphthene	46-118	≤31	44	-	37	None
		1,4-Dichlorobenzene	-	≤28	-	-	33	None
		1,2,4-Trichlorobenzene	-	≤28	-	-	34	None
		2,4-Dinitrotoluene	-	≤38	-	-	40	None
		Pyrene	-	≤31	-	-	36	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF034 cont.	30G00301	Pesticides/PCBs	-	-	-	-	-	None
WF035	66G01701	Volatiles Semivolatiles Pesticides/PCBs	-	-	-	-	-	None None None
WF036	54G00101	Volatiles Semivolatiles 4-Nitrophenol 1,4-Dichlorobenzene 1,2,4-Trichlorobenzene Pesticides/PCBs	10-80	- ≤28 ≤28	101	81	- 30 36	None None J J None
WF037	15G00803	Volatiles	-	-	-	-	-	None
WF038	36BO0303	Volatiles	-	-	-	-	-	None
WF039	35BO0203	Volatiles	-	-	-	-	-	None
WF040	37BO0203	Volatiles	-	-	-	-	-	None
WF041	35G00101	Volatiles Semivolatiles <u>Pesticides & PCBs</u> Aldrin	-	-	-	-	-	None None J (all detects)
WF042	05G00902	Volatiles	-	-	-	-	-	None
WF043	05G00802	Volatiles	-	-	-	-	-	None
WF044	66G01201	Volatiles Trichloroethene	-	≤14	-	-	40	None
WF045	OWG00502	Volatiles <u>Semivolatiles</u> 4-Nitrophenol 2,4-Dinitrotoluene	10-80 24-96	- -	96	109 100	-	None J (all detects) J (all detects)

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF045 cont.	OWG00502	<u>Pesticides & PCBs</u> gamma-BHC Heptachlor Aldrin Dieldrin Endrin	- - 40-120 52-126 56-121	≤15 ≤20 ≤22 ≤18 ≤21	- - - - -	- - 128 134 144	28 24 29 22 22	J J J J J
WF046	31G00101	Volatiles <u>Semivolatiles</u> 4-Nitrophenol <u>Pesticides & PCBs</u> Endrin	- - 10-80 - 56-121	- - - - -	- 88 127	- 96	- -	None J (all detects) J (all detects)
WF047	39W034	Volatiles	-	-	-	-	-	None
WF048	39D018	Volatiles	-	-	-	-	-	None
WF049	39W021	Volatiles	-	-	-	-	-	None
	None	Semivolatiles	-	-	-	-	-	None
WF051	16G00401	Volatiles	-	-	-	-	-	None
WF052	39020	Volatiles	-	-	-	-	-	None
WF053	15G00602	Volatiles	-	-	-	-	-	None
WF054	15G00801	Volatiles	-	-	-	-	-	None
WF055	13G00401	Volatiles	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF022	Client ID Laboratory ID Collection Date	BKG00101 RB858003 7/16/96	BKG00101D RB858004 7/16/96	
	Acetone	ND	8 ug/L	Not calculable
	Semivolatiles Pesticides/PCBs	ND ND	ND ND	-
WF022	Client ID Laboratory ID Collection Date	01G00102 RB873008 7/19/96	01G00102D RB873009 7/19/96	
	Acetone	4 ug/L	2 ug/L	67
	Semivolatiles Pesticides/PCBs	ND ND	ND ND	-
WF023	Client ID Laboratory ID Collection Date	02G00301 RB887012 7/24/96	02G00301D RB887013 7/24/96	
	Acetone Carbon disulfide	ND 1 ug/L	10 ug/L ND	Not calculable Not calculable
	Semivolatiles Pesticides/PCBs	ND ND	ND ND	-
WF024	Client ID Laboratory ID Collection Date	15G00701 RB920009 7/31/96	15G00701D RB920010 7/31/96	
	Acetone	2	ND	Not calculable
	Semivolatiles Pesticides/PCBs	ND ND	ND ND	-
WF025	Client ID Laboratory ID Collection Date	15G00601 RB956006 8/7/96	15G00601D RB956008 8/7/96	
	Acetone	5 ug/L	8 ug/L	46
	1,2-Dichloroethene (total)	1 ug/L	1 ug/L	0
	Chlorobenzene	5 ug/L	5 ug/L	0
	Ethylbenzene	10U ug/L	1 ug/L	Not calculable
	1,4-Dichlorobenzene	12 ug/L	12 ug/L	0
	Naphthalene	4 ug/L	4 ug/L	0
WF026	Diethylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	-
	Client ID Laboratory ID Collection Date	15G00803 RB980007 8/14/96	15G00803D RB980008 8/14/96	
	Acetone 2-Butanone Trichloroethene	25 ug/L 7 ug/L 4 ug/L	5 ug/L 10U ug/L 4 ug/L	133 Not calculable 0
	Bis(2-ethylhexyl)phthalate	2 ug/L	1 ug/L	67
WF026	4,4'-DDT	0.16 ug/L	0.079 ug/L	68

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF026	Client ID Laboratory ID Collection Date	16G00403 RB980020 8/16/96	16G00403D RB980021 8/16/96	
	Acetone	3 ug/L	2 ug/L	40
	1,2-Dichloroethene (total)	1 ug/L	2 ug/L	67
	Benzene	600 ug/L	600 ug/L	0
	Phenol	8 ug/L	8 ug/L	0
	Naphthalene	1 ug/L	2 ug/L	67
	Bis(2-ethylhexyl)phthalate	1 ug/L	100 ug/L	Not calculable
WF026	Pesticides/PCBs	ND	ND	None
	Client ID Laboratory ID Collection Date	16G00403DL RB980020DL 8/16/96	16G00403DDL RB9890021DL 8/16/96	
	Acetone	18 ug/L	24 ug/L	29
WF027	Benzene	700 ug/L	740 ug/L	6
	Client ID Laboratory ID Collection Date	16G00501 RC016009 8/21/96	16G00501D RC016013 8/21/96	
	Volatiles	ND	ND	None
	Bis(2-ethylhexyl)phthalate	2 ug/L	100 ug/L	Not calculable
WF027	Pesticides/PCBs	ND	ND	None
	Client ID Laboratory ID Collection Date	09G00301 RC016019 8/23/96	09G00301D RC016020 8/23/96	
	Acetone	46 ug/L	18 ug/L	88
	2-Butanone	2 ug/L	100 ug/L	Not calculable
	Semivolatiles	ND	ND	None
WF028	Pesticides/PCBs	ND	ND	None
	Client ID Laboratory ID Collection Date	11G00201 RC044011 8/28/96	11G00201D RC044018 8/28/96	
	Acetone	5 ug/L	11 ug/L	75
	Phenol	4 ug/L	6 ug/L	40
	Bis(2-ethylhexyl)phthalate	5 ug/L	4 ug/L	22
WF028	Pesticides/PCBs	ND	ND	None
	Client ID Laboratory ID Collection Date	12G00101 RC044012 8/27/96	12G00101D RC044017 8/27/96	
	Acetone	3 ug/L	6 ug/L	67
	Bis(2-ethylhexyl)phthalate	2 ug/L	2 ug/L	0
WF028	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF029	Client ID Laboratory ID Collection Date	14G00101 RC092007 9/11/96	14G00101D RC092009 9/11/96	
	Acetone	8 ug/L	4 ug/L	67
	Carbon disulfide	3 ug/L	10U ug/L	Not calculable
	Methylene chloride	1 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	4 ug/L	4 ug/L	0
WF030	Pesticides/PCBs	ND	ND	None
	Client ID Laboratory ID Collection Date	66G00601 RC121007 9/18/96	66G00601D RC121011 9/18/96	
	Acetone	2 ug/L	8 ug/L	120
	Methylene chloride	2 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	3 ug/L	40
WF030	Pesticides/PCBs	ND	ND	None
	Client ID Laboratory ID Collection Date	66G02203 RC121016 9/20/96	66G02203D RC121017 9/20/96	
	Acetone	4 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF031	Client ID Laboratory ID Collection Date	05G01001 MB928007 9/25/96	05G01001D MB928012 9/25/96	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF031	Client ID Laboratory ID Collection Date	33G00301 MB958006 9/27/96	33G00301D MB958007 9/27/96	
	1,1-Dichloroethene	5 ug/L	6 ug/L	18
	1,2-Dichloroethene (total)	4 ug/L	3 ug/L	29
	Trichloroethene	300 ug/L	300 ug/L	0
	Di-n-butylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF032	Client ID Laboratory ID Collection Date	29G00501 MC011007 10/2/96	29G00501D MC011008 10/2/96	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF033	Client ID Laboratory ID Collection Date	66G00201 MC118002 10/9/96	66G00201D MC118003 10/9/96	
	Trichloroethene	1 ug/L	1 ug/L	0
	Toluene	1 ug/L	1 ug/L	0
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF034	Client ID Laboratory ID Collection Date	30G00301 MC153005 10/16/96	30G00301D MC153008 10/16/96	
	1,2-Dichloroethene (total)	31 ug/L	31 ug/L	0
	Trichloroethene	340 ug/L	340 ug/L	0
	Di-n-butylphthalate	2 ug/L	100 ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF035	Client ID Laboratory ID Collection Date	66G01701 MC214005 10/23/96	66G01701D MC214007 10/23/96	
	Volatiles	ND	ND	None
	Di-n-butylphthalate	3 ug/L	2 ug/L	40
	Pesticides/PCBs	ND	ND	None
WF036	Client ID Laboratory ID Collection Date	54G00101 MC262004 10/30/96	54G00101D MC262008 10/30/96	
	Volatiles	ND	ND	None
	Diethylphthalate	1 ug/L	100 ug/L	Not calculable
	Di-n-butylphthalate	1 ug/L	100 ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF037	Client ID Laboratory ID Collection Date	15G00803 MC424007 11/20/96	15G00803D MC424008 11/20/96	
	Trichloroethene	5 ug/L	5 ug/L	0
WF038	Client ID Laboratory ID Collection Date	36BO0303 MC687010 12/17/96	36BO0303D MC687011 12/17/96	
	Volatiles	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF038	Client ID Laboratory ID Collection Date	36BO0403 MC687014 12/18/96	36BO0403D MC687015 12/18/96	
	Volatiles	ND	ND	None
WF039	Client ID Laboratory ID Collection Date	35BO0302 MC698013 12/21/96	35BO0302D MC698015 12/21/96	
	Volatiles	ND	ND	None
WF039	Client ID Laboratory ID Collection Date	35BO0203 MC698010 12/21/96	35BO0203D MC698016 12/21/96	
	Volatiles	ND	ND	None
WF040	Client ID Laboratory ID Collection Date	37BO0203 MC783010 1/8/97	37BO0203D MC783018 1/8/97	
	Acetone Methylene chloride	14 ug/Kg 2 ug/Kg	12 ug/Kg 10 ug/Kg	15 133
WF040	Client ID Laboratory ID Collection Date	37BO0103 MC783013 1/8/97	37BO0103D MC783019 1/8/97	
	Acetone Methylene chloride	18 ug/Kg 3 ug/Kg	22 ug/Kg 11 ug/Kg	20 114
WF041	Client ID Laboratory ID Collection Date	35G00101 MD908004 6/11/97	35G00101D MD908005 6/11/97	
	<u>Volatiles</u> 1,1-Dichloroethene 1,1,1-Trichloroethane Xylene (total)	6 ug/L 2 ug/L 2 ug/L	7 ug/L 2 ug/L 1 ug/L	15 0 67
	Semivolatiles Pesticides & PCBs	ND ND	ND ND	- -
WF041	Client ID Laboratory ID Collection Date	35G00202 MD950002 6/15/97	35G00202D MD950003 6/15/97	
	<u>Volatiles</u> Chloroform	3 ug/L	3 ug/L	0
	<u>Semivolatiles</u> Bis(2-ethylhexyl)phthalate	10U ug/L	5 ug/L	Not calculable
	Pesticides & PCBs	ND	ND	-
WF042	Client ID Laboratory ID Collection Date	05G00902 ME007004 6/19/97	05G00902D ME007005 6/19/97	
	Volatiles	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF043	Client ID Laboratory ID Collection Date	05G00802 ME042004 6/24/97	05G00802D ME042005 6/24/97	
	<u>Volatiles</u> Benzene Trichloroethene Xylenes (total)	1 ug/L 4 ug/L 1 ug/L	10U ug/L 10U ug/L 10U ug/L	Not calculable Not calculable Not calculable
WF043	Client ID Laboratory ID Collection Date	07G00101 ME087002 6/26/97	07G00101D ME087003 6/26/97	
	Acetone Benzene Toluene Ethylbenzene Xylenes, total	540 ug/L 3900 ug/L 14000 ug/L 1800 ug/L 3200 ug/L	490 ug/L 4400 ug/L 16000 ug/L 2000 ug/L 3600 ug/L	10 12 13 10 12
WF044	Client ID Laboratory ID Collection Date	66G01201 ME110002 6/30/97	66G01201D ME110003 6/30/97	
	<u>Volatiles</u> 1,1-Dichloroethene 1,2-Dichloroethene (total) Trichloroethene	3 ug/L 3 ug/L 120 ug/L	2 ug/L 3 ug/L 96 ug/L	40 0 22
WF044	Client ID Laboratory ID Collection Date	66G00603 ME135002 7/2/97	66G00603D ME135003 7/2/97	
	<u>Volatiles</u> Trichloroethene	1 ug/L	1 ug/L	0
WF045	Client ID Laboratory ID Collection Date	OWG00502 ME149004 7/8/97	OWG00502D ME149005 7/8/97	
	<u>Volatiles</u> Acetone	3 ug/Kg	2 ug/Kg	40
	Semivolatiles Pesticides & PCBs	ND ND	ND ND	- -
WF045	Client ID Laboratory ID Collection Date	OWG00302 ME190002 7/10/97	OWG00302D ME190003 7/10/97	
	<u>Volatiles</u> Pesticides & PCBs	ND ND	ND ND	- -
	<u>Semivolatiles</u> Di-n-butylphthalate	4 ug/L	6 ug/L	40
WF046	Client ID Laboratory ID Collection Date	31G00101 ME241003 7/15/97	31G00101D ME241004 7/15/97	
	<u>Volatiles</u> Pesticides & PCBs	ND ND	ND ND	- -
	<u>Semivolatiles</u> Di-n-butylphthalate	6 ug/L	3 ug/L	67

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF047	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u> Acetone Carbon disulfide	39W034 ME243005 7/15/97 4 ug/L 10 ug/L	39W034D ME243006 7/15/97 5 ug/L 1 ug/L	Not calculable Not calculable
WF047	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u> Methylene chloride Benzene	39W012 ME267004 7/16/97 20 ug/L 2 ug/L	39W012D ME267005 7/16/97 1 ug/L 2 ug/L	Not calculable 0
WF048	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u> Acetone Trichloroethene	39D018 ME264006 7/17/97 27 ug/Kg 2 ug/Kg	39D018D ME264007 7/17/97 27 ug/Kg 2 ug/Kg	0 0
WF049	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u>	39W021 ME263004 7/17/97 ND	39W021D ME263005 7/17/97 ND	- -
WF051	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u> Acetone	16G00401 ME306003 7/22/97 18 ug/L	16G00401D ME306003 7/22/97 14 ug/L	25
WF051	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u>	16G00101 ME340009 7/24/97 ND	16G00101D ME340010 7/24/97 ND	- -
WF052	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u>	39020 ME346004 7/25/97 ND	39020D ME346005 7/25/97 ND	- -
WF053	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u> Trichloroethene	15G00602 ME367004 7/27/97 2 ug/L	15G00602D ME367005 7/27/97 2 ug/L	0
WF053	<u>Client ID</u> <u>Laboratory ID</u> <u>Collection Date</u> <u>Volatiles</u> 1,2-Trichloroethene (total) Trichloroethene 1,1-Dichloroethene	15G00703 ME404003 7/30/97 1 ug/L 36 ug/L 2 ug/L	15G00703D ME404004 7/30/97 2 ug/L 38 ug/L 100 ug/L	67 5 Not calculable

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF054	Client ID Laboratory ID Collection Date	15G00801 ME441002 8/4/97	15G00801D ME441003 8/4/97	
	Volatiles Chlorobenzene	4 ug/L	4 ug/L	0
WF055	Client ID Laboratory ID Collection Date	OWG00401 MF004003 10/27/97	OWG00401D MF004004 10/27/97	
	Volatiles	ND	ND	-

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF022	All All	Volatiles Semivolatiles <u>Pesticides/PCBs</u>	All within QC limits All within QC limits	- -	- - 10	None None
	BKR01001	Decachlorobiphenyl	58	60-150		J
	BKG00101	Decachlorobiphenyl	58	60-150		J
	BKG00102	Tetrachloro-m-xylene	59	60-150		J
	BKG00103	Tetrachloro-m-xylene	57	60-150		J
	BKG00202	Decachlorobiphenyl	37	60-150		J
	BKG00201	Decachlorobiphenyl	37	60-150		J
	BKG00201	Decachlorobiphenyl	40	60-150		J
	BKG00201	Decachlorobiphenyl	41	60-150		J
	BKG00202	Decachlorobiphenyl	47	60-150		J
	BKG00201	Decachlorobiphenyl	47	60-150		J
	BKG00201	Decachlorobiphenyl	43	60-150		J
	BKF01001	Decachlorobiphenyl	43	60-150		J
	BKF01001	Tetrachloro-m-xylene	59	60-150		J
	BKF01001	Tetrachloro-m-xylene	59	60-150		J
	17G00101	Decachlorobiphenyl	51	60-150		J
	17G00101	Decachlorobiphenyl	47	60-150		J
	17G00201	Decachlorobiphenyl	58	60-150		J
	17G00201	Decachlorobiphenyl	56	60-150		J
	17G00201	Decachlorobiphenyl	22	60-150		J
	01G00102D	Decachlorobiphenyl	21	60-150		J
	01G00102D	Decachlorobiphenyl	59	60-150		J
	01G00102D	Decachlorobiphenyl	56	60-150		J
WF023	All All	Volatiles Semivolatiles <u>Pesticides/PCBs</u>	All within QC limits All within QC limits	- -	- - 5	None None
	01G00201	Decachlorobiphenyl	32	60-150		J
	01G00301	Decachlorobiphenyl	28	60-150		J
	02G00101	Decachlorobiphenyl	49	60-150		J
	02G00101	Decachlorobiphenyl	47	60-150		J
	16G00703	Decachlorobiphenyl	41	60-150		J
	16G00703	Decachlorobiphenyl	42	60-150		J
	18G00301	Decachlorobiphenyl	59	60-150		J
	18G00301	Decachlorobiphenyl	55	60-150		J
	18G00301	Decachlorobiphenyl	48	60-150		J
	18G00301	Decachlorobiphenyl	46	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF024	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	BKG00203	Pesticides/PCBs			1	
		Decachlorobiphenyl	52	60-150	-	J
WF025	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	15G00101	Pesticides/PCBs			5	
		Decachlorobiphenyl	21	60-150	-	J
	15G00303	Decachlorobiphenyl	20	60-150	-	J
		Tetrachloro-m-xylene	57	60-150	-	J
	15G00502	Tetrachloro-m-xylene	58	60-150	-	J
		Tetrachloro-m-xylene	155	60-150	-	J (all detects)
	15R01301 15G00502RE	Tetrachloro-m-xylene	162	60-150	-	J (all detects)
		Decachlorobiphenyl	59	60-150	-	J
WF026	All	Volatiles	All within QC limits	-	-	None
	15G00802 15G00802R	Semivolatiles			2	
		2-Fluorobiphenyl	161	43-116	-	J (all detects) all B/N
		Terphenyl-d14	163	33-141	-	J (all detects) all B/N
		2-Fluorobiphenyl	182	43-116	-	J (all detects) all B/N
		Terphenyl-d14	153	33-141	-	J (all detects) all B/N

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Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF026 cont.	15G00201	Pesticides/PCBs				
		Decachlorobiphenyl	52	60-150	9	J
	15G00202	Decachlorobiphenyl	50	60-150		J
		Decachlorobiphenyl	58	60-150		J
	15G00801	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	43	60-150		J
	15G00803	Decachlorobiphenyl	38	60-150		J
		Decachlorobiphenyl	58	60-150		J
	16G00201	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	43	60-150		J
	16G00203	Decachlorobiphenyl	37	60-150		J
		Decachlorobiphenyl	44	60-150		J
	16G00403	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	40	60-150		J
	16G00403D	Decachlorobiphenyl	39	60-150		J
		Decachlorobiphenyl	47	60-150		J
	16G00601	Decachlorobiphenyl	46	60-150		J
		Decachlorobiphenyl	25	60-150		J
		Decachlorobiphenyl	25	60-150		J
WF027	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	16G00304	Pesticides/PCBs				
		Decachlorobiphenyl	46	60-150	2	J
		Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	58	60-150		J
	66G02103	Decachlorobiphenyl	58	60-150		J
WF028	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	10G00101	Pesticides/PCBs				
		Decachlorobiphenyl	50	60-150	5	J
	11G00101	Decachlorobiphenyl	48	60-150		J
		Decachlorobiphenyl	47	60-150		J
	11G00301	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	25	60-150		J
	11G00401	Decachlorobiphenyl	24	60-150		J
		Decachlorobiphenyl	29	60-150		J
	11G00201D	Decachlorobiphenyl	29	60-150		J
		Decachlorobiphenyl	59	60-150		J

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Summary of Surrogate Recoveries
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NAS Whiting Field, Milton Florida

Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF029	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	13G00101	<u>Pesticides/PCBs</u>			3	
		Decachlorobiphenyl	23	60-150		J
	66G00901	Decachlorobiphenyl	23	60-150		J
		Decachlorobiphenyl	43	60-150		J
	66G00903	Decachlorobiphenyl	42	60-150		J
		Decachlorobiphenyl	52	60-150		J
		Decachlorobiphenyl	52	60-150		J
WF030	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	66G00804	<u>Pesticides/PCBs</u>			1	
		Decachlorobiphenyl	31	60-150		J
		Decachlorobiphenyl	31	60-150		J
WF031	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	05G00301	<u>Pesticides/PCBs</u>			3	
		Tetrachloro-m-xylene	56	60-150		J
	05G00101	Tetrachloro-m-xylene	52	60-150		J
		Decachlorobiphenyl	164	60-150		J (all detects)
	05G01002	Tetrachloro-m-xylene	57	60-150		J
WF031B	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	All	Pesticides/PCBs	All within QC limits	-	-	None
WF032	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	29G00101	<u>Pesticides/PCBs</u>			1	
		Tetrachloro-m-xylene	54	60-150		J
		Tetrachloro-m-xylene	56	60-150		J

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Summary of Surrogate Recoveries
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NAS Whiting Field, Milton Florida

Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF033	All	Volatiles Semivolatiles	All within QC limits All within QC limits	- -	- -	None None
	07G00101	<u>Pesticides/PCBs</u>				
	30G00501	Tetrachloro-m-xylene	174	60-150	3	J (all detects)
	66G00201D	Tetrachloro-m-xylene	59	60-150		J
		Tetrachloro-m-xylene	25	60-150		J
		Tetrachloro-m-xylene	36	60-150		J
WF034	All	Volatiles Semivolatiles	All within QC limits All within QC limits	- -	- -	None None
	66G01801	<u>Pesticides/PCBs</u>			1	
		Tetrachloro-m-xylene	164	60-150		J (all detects)
WF035	All	Volatiles Semivolatiles	All within QC limits All within QC limits	- -	- -	None None
	08G00101	<u>Pesticides/PCBs</u>			1	
		Tetrachloro-m-xylene	59	60-150		J
WF036	All	Volatiles Semivolatiles	All within QC limits All within QC limits	- -	- -	None None
	54G00101	<u>Pesticides/PCBs</u>			1	
		Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
WF037	All	Volatiles Semivolatiles	All within QC limits All within QC limits	- -	- -	None None
		<u>Pesticides/PCBs</u>	All within QC limits	-	-	None
WF038	All	Volatiles	All within QC limits	-	-	None
WF039	All	Volatiles	All within QC limits	-	-	None
WF040	All	Volatiles	All within QC limits	-	-	None

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF045 cont.	OWG00103	2-Fluorophenol	0	21-110	4	J (all detects) R (all non-detects)
		Phenol-d5	0	10-110		
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		
	OWG00101	<u>Pesticides & PCBs</u>		60-150	2	J
		Tetrachloro-m-xylene	45			
WF046	All	Tetrachloro-m-xylene	52	60-150	-	None
		Tetrachloro-m-xylene	59	60-150		
	OWG00103	Tetrachloro-m-xylene	54	60-150	-	J
		Tetrachloro-m-xylene	52	60-150		
	OWG00302	Tetrachloro-m-xylene	53	60-150	-	J
		Tetrachloro-m-xylene	52	60-150		
	31G00101	<u>Pesticides & PCBs</u>		60-150	2	J
WF047	All	Tetrachloro-m-xylene	48			
		Tetrachloro-m-xylene	55			
		Tetrachloro-m-xylene	59			
WF048	All	Volatiles	-	-	-	None
WF049	All	Volatiles	-	-	-	None
WF049	All	Semivolatiles	-	-	-	None
WF051	All	Volatiles	-	-	-	None
WF052	All	Volatiles	-	-	-	None
WF053	All	Volatiles	-	-	-	None
WF054	All	Volatiles	-	-	-	None

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Summary of Surrogate Recoveries
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NAS Whiting Field, Milton Florida

Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF055	All	Volatiles	-	-	-	None
<p>Notes: J = estimated value UJ = undetected, but number that is reported as the quantification limit is an estimated value.</p>						

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF022	6/25/96	<u>Volatiles</u> Acetone	30.2	-	J
	7/19/96	Chloromethane Chloroethane	-	28.8 48.7	J J
	7/22/96	Chloroethane	-	30.6	J
	8/13/96	<u>Semivolatiles</u> 4,6-Dinitro-2-methylphenol Pentachlorophenol	-	27.2 25.4	J J
	8/14/96	4-Chloroaniline 2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	-	31.6 27.6 33.8	J J J
	All	Pesticides/PCBs	-	-	None
WF023	6/25/96	<u>Volatiles</u> Acetone	30.2	-	J
	7/25/96	Acetone	-	33.2	J
	7/31/96	Acetone Methylene chloride Carbon disulfide	-	30.4 31.7 27.2	J J J
	8/1/96	Chloroethane Carbon disulfide Methylene chloride	-	27.5 27.5 37.8	J J J
	8/20/96	<u>Semivolatiles</u> 4-Nitroaniline Chrysene	-	37.8 27.8	J J
	8/21/96	4-Nitroaniline Chrysene Benzo(g,h,i)perylene	-	31.5 28.5 32.7	J J J
	8/25/96	4,4'-DDT	23.6	-	J
WF024	6/25/96	<u>Volatiles</u> Acetone	30.2	-	J
	8/5/96	Acetone	33.8	-	J
	8/2/96	Chloroethane Carbon disulfide Methylene chloride	-	29.5 30.8 41.0	J J J
	8/21/96	<u>Semivolatiles</u> 4-Nitroaniline Chrysene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	-	28.7 29.5 28.1 34.0 37.6	J J J J J
	All	Pesticides/PCBs	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF025	8/5/96	<u>Volatiles</u>			
		Acetone	33.8	-	J
		Chloromethane	26.7	-	J
	8/14/96	Chloroethane	28.5	-	J
		Acetone	29.7	-	J
	9/9/96	<u>Semivolatiles</u>			
		2,4-Dinitrophenol	-	29.9	J
		4-Nitroaniline	-	27.6	J
		4,6-Dinitro-2-methylphenol	-	30.7	J
		Pyrene	-	30.0	J
		3,3'-Dichlorobenzidine	-	37.0	J
		2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
		Pentachlorophenol	-	27.8	J
	8/25/96	3,3'-Dichlorobenzidine	-	27.8	J
	8/25/96	4,4'-DDT	23.6	-	J
WF026	8/5/96	<u>Volatiles</u>			
		Acetone	33.8	-	J
		Chloromethane	-	46.5	J
		Chloroethane	-	77.1	J
	8/19/96	1,1-Dichloroethane	-	28.6	J
		2-Butanone	-	30.3	J
	8/20/96	Chloromethane	-	32.5	J
		Chloroethane	-	32.4	J
		Acetone	-	37.9	J
	8/22/96	Carbon disulfide	-	28.0	J
		2-Butanone	-	27.8	J
	9/10/96	<u>Semivolatiles</u>			
		2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
		Pentachlorophenol	-	27.8	J
		3,3'-Dichlorobenzidine	-	27.8	J
	9/10/96	4-Chloroaniline	-	36.8	J
		3-Nitroaniline	-	37.9	J
		2,4-Dinitrophenol	-	29.3	J
		4-Nitroaniline	-	49.5	J
		4,6-Dinitro-2-methylphenol	-	29.4	J
		Pentachlorophenol	-	29.6	J
		3,3'-Dichlorobenzidine	-	54.1	J
	9/14/96	<u>Pesticides & PCBs</u>			
		alpha-BHC	22.2	-	J
		delta-BHC	22.1	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF027	9/1/96	<u>Volatiles</u> 2-Butanone 2-Butanone	39.1 0.014 (RRF)	-	J J(detects) / R(ND)
	8/5/96	Acetone	33.8	-	J
	9/2/96	Acetone 2-Butanone	-	102.4 36.3	J J
	8/22/96	Acetone Carbon disulfide 2-Butanone	-	37.9 28.0 27.8	J J J
	8/29/96	Bromomethane Chloroethane Acetone	-	31.0 63.9 37.2	J J J
	9/2/96	Chloromethane Chloroethane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone 2-Butanone	-	32.4 28.4 49.2 38.7 35.7 38.9 0.019 (RRF)	J J J J J J J (detects) / R (ND)
	9/3/96	Chloromethane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	-	27.4 34.7 32.6 32.9 38.9	J J J J J
	9/10/96	<u>Semivolatiles</u> 4-Chloroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitroaniline 4,6-Dinitro-2-methylphenol Pentachlorophenol 3,3'-Dichlorobenzidine	-	36.8 37.9 29.3 49.5 29.4 29.6 54.1	J J J J J J J
	9/20/96	3,3'-Dichlorobenzidine	-	30.4	J
	All	Pesticides/PCBs	-	-	None
WF028	8/5/96	<u>Volatiles</u> Acetone	33.8	-	J
	9/2/96	Chloromethane Chloroethane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	-	32.4 28.4 49.2 38.7 35.7 38.9	J J J J J J
	9/3/96	Chloromethane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone	-	27.4 34.7 32.6 32.9 38.9	J J J J J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF028 cont.	9/6/96	Chloromethane	-	35.4	J
		Acetone	-	41.0	J
		2-Butanone	-	41.6	J
		1,2-Dichloropropane	-	27.6	J
		4-Methyl-2-pentanone	-	40.5	J
		2-Hexanone	-	43.3	J
		Bromoform	-	26.2	J
		1,1,2,2-Tetrachloroethane	-	26.5	J
	9/20/96	<u>Semivolatiles</u>			
		3,3'-Dichlorobenzidine	-	30.4	J
	9/26/96	Benzo(k)fluoranthene	-	28.5	J
	All	Pesticides/PCBs	-	-	None
WF029	9/17/96	<u>Volatiles</u>			
		Chloromethane	-	38.1	J
		Methylene chloride	-	33.6	J
	9/18/96	2-Hexanone	-	26.5	J
		<u>Semivolatiles</u>			
	9/26/96	Benzo(k)fluoranthene	-	28.5	J
	9/26/96	Benzo(k)fluoranthene	-	25.6	J
	All	Pesticides/PCBs	-	-	None
WF030	9/20/96	<u>Volatiles</u>			
		Methylene chloride	-	35.2	J
	9/23/96	Methylene chloride	-	30.2	J
		<u>Semivolatiles</u>			
	10/16/96	2,4-Dinitrophenol	-	25.8	J
		4-Nitrophenol	-	28.0	J
	All	Pesticides/PCBs	-	-	None
WF031	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
	11/5/96	<u>Pesticides & PCBs</u>			
		delta-BHC	21.2	-	J
WF031B	All	Volatiles	-	-	None
	11/28/96	<u>Semivolatiles</u>			
		Di-n-octylphthalate	-	25.3	J
	12/9-10/97	<u>Pesticides & PCBs</u>			
		Alpha-BHC	23.9	-	J
WF032	10/10/96	<u>Volatiles</u>			
		1,1,2,2-Tetrachloroethane	-	27.8	J
	11/3/96	<u>Semivolatiles</u>			
		Hexachlorobutadiene	-	33.5	J
		Hexachlorocyclopentadiene	-	31.5	J
	11/5/96	Di-n-octylphthalate	-	27.0	J
		<u>Pesticides & PCBs</u>			
		delta-BHC	21.2	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF033	10/16/96	<u>Volatiles</u> Acetone	-	25.3	J
	11/4/96	<u>Semivolatiles</u> Hexachlorobutadiene Hexachlorocyclopentadiene	-	31.2 27.9	J J
	All	Pesticides/PCBs	-	-	None
WF034	All	Volatiles	-	-	None
	11/26/96	<u>Semivolatiles</u> Di-n-octylphthalate	-	33.9	J
	All	Pesticides/PCBs	-	-	None
WF035	All	Volatiles	-	-	None
	11/26/96	<u>Semivolatiles</u> Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	-	25.6 32.1	J J
	11/27/96	Di-n-octylphthalate	-	30.0	J
	11/5/96	<u>Pesticides & PCBs</u> delta-BHC	21.2	-	J
WF036	All	Volatiles	-	-	None
		<u>Semivolatiles</u> Di-n-octylphthalate Di-n-octylphthalate	-	30.0 25.3	J J
		<u>Pesticides & PCBs</u> alpha-BHC	23.9	-	J
WF037	All	Volatiles	-	-	None
	11/28/96	<u>Semivolatiles</u> Di-n-octylphthalate	-	25.3	J
	12/9-10/96	<u>Pesticides & PCBs</u> alpha-BHC	23.9	-	J
WF038	12/26/96	<u>Volatiles</u> Acetone	-	30.6	J
WF039	12/26/96	<u>Volatiles</u> Acetone	-	30.6	J
WF040	All	Volatiles	-	-	None
WF041	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
	6/11-12/97	<u>Pesticides & PCBs</u> Methoxychlor delta-BHC	24.2 21.5	-	J J
WF042	All	Volatiles	-	-	None
WF043	All	Volatiles	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF044	7/7/97	<u>Volatiles</u> Bromomethane	-	33.5	J
WF045	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
	7/31/97	<u>Pesticides & PCBs</u> alpha-BHC alpha-BHC gamma-BHC	20.3 24.2 21.9	- - -	J J J
	All	Volatiles	-	-	None
WF046	All	Semivolatiles	-	-	None
	7/31/97	<u>Pesticides & PCBs</u> alpha-BHC alpha-BHC gamma-BHC	20.3 24.2 21.9	- - -	J J J
	7/21/97	<u>Volatiles</u> Acetone	35.4	-	J
	7/21/97	Acetone	0.023 RRF	-	J (all detects)
WF047		2-Butanone	0.030 RRF	-	R (all non-detects)
	7/28/97	Bromomethane	-	34.6	J
		Acetone	-	35.1	J
	7/29/97	Bromo:methane	-	30.5	J
		Acetone	-	30.9	J
	7/21/97	Acetone	-	0.020 (RRF)	J (all detects)
		2-Butanone	-	0.030 (RRF)	R (all non-detects)
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects)
		2-Butanone	-	0.030 (RRF)	R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects)
WF048		2-Butanone	-	0.026 (RRF)	R (all non-detects)
	7/29/97	Acetone	-	0.015 (RRF)	J (all detects)
		2-Butanone	-	0.026 (RRF)	R (all non-detects)
	7/25/97	<u>Volatiles</u> Bromomethane	36.5	-	J
	7/26/97	Bromomethane	-	28.7	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF049	7/21/97	<u>Volatiles</u> Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/28/97	Bromomethane Acetone	-	34.6 35.1	J J
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
All		Semivolatiles	-	-	None
WF051	All	Volatiles	-	-	None
WF052	7/21/97	<u>Volatiles</u> Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/29/97	Bromomethane Acetone	-	30.5 30.9	J J
	7/29/97	Acetone	-	0.016 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
WF053	8/8/97	<u>Volatiles</u> Acetone	-	36.4	J
WF054	8/19/97	<u>Volatiles</u> Acetone	39.1	-	J
	8/8/97	Acetone	-	36.4	J
	8/19/97	Acetone	-	30.3	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF055	All	Volatiles	-	-	None
Notes: %RSD = percent Relative Standard Deviation for initial calibrations %D = percent Difference for continuing calibrations					
J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").					
UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.					
R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.					

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF022	<u>Volatiles</u> Acetone	8 ug/L	BKT01001 BKR01001 BKG00101 BKG00101D BKG00102 BKG00103
	Methylene chloride Acetone	1 ug/L 16 ug/L	BKG00202 BKG00201 BKF01001
	Acetone	14 ug/L	17T01101 17G00102 17G00101 17G00201 17G00301 01G00101 01G00102 01G00102D
	Semivolatiles Pesticides/PCBs	ND ND	- -
WF023	<u>Volatiles</u> Methylene chloride Acetone	2 ug/L 15 ug/L	01T01201 01G00401 01G00201 01G00301 BKG00301 02G00201 02G00101 18G00301 02G00301 02G00301D
	Semivolatiles Pesticides/PCBs	ND ND	- -
WF024	<u>Volatiles</u> Acetone	2 ug/L	18T01401 18G00101 15G00401 BKG00203 15R01201 15G00701
	Semivolatiles Pesticides/PCBs	ND ND	- -
WF025	<u>Volatiles</u> Acetone	3 ug/L	15G00503DL 15R01301 15T01601 15G00301 15G00302 15G00303 15G00101 15G00203
	Semivolatiles Pesticides/PCBs	ND ND	- -

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF026	<u>Volatiles</u> Acetone	11 ug/L	15T01701 15G00202 15G00201 15G00802 15G00801 16G00201 15G00803D 15R01401
	Acetone	4 ug/L	15G00803 16T01801 16G00202 16G00203
	Acetone	5 ug/L	16G00202DL 16G00602 16G00601 16G00403 16G00403DL 16G00403D 16G00403DDL
	Semivolatiles Pesticides/PCBs	ND ND	- -
WF027	<u>Volatiles</u> Acetone	5 ug/L	16G00401 16G00402 16G00101 16G00301
	Acetone	5 ug/L	09G00301
	Acetone Trichloroethene Xylenes (total)	6 ug/L 1 ug/L 2 ug/L	16G00501 16R01501 16G00501D 66T02001 66G02101 66G02103
	Acetone	11 ug/L	16G00303 66G02102 09G00101 09G00301D
	Semivolatiles Pesticides/PCBs	ND ND	- -
WF028	<u>Volatiles</u> Acetone	5 ug/L	10T02101 09G00201 10G00201 11G00102 11G00401 11T02201 11G00301
	Acetone	11 ug/L	10G00101 11G00402 11G00201 12G00201

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF028 cont.	Acetone	5 ug/L	11G00101
	Carbon disulfide	6 ug/L	12G00101 11R01601 12G00101D 11G00201D
WF029	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
	Volatiles		
WF029	Acetone	3 ug/L	13T02301 13G00101 13R01701
	Acetone	3 ug/L	13G00102 13G00201 13G00103 14G00201 14G00101 14G00101D 66T02401 66G00901 66G00904 66G00902 66G00903
WF030	Semivolatiles	1 ug/L	All samples in SDG WF029
	Bis(2-ethylhexyl)phthalate		
	Pesticides/PCBs	ND	-
WF030	Volatiles		
	Acetone	3 ug/L	66T02501 66G00801 66G00802 66G00803 66G00804
	Semivolatiles		
WF030	Bis(2-ethylhexyl)phthalate	2 ug/L	All samples in SDG WF030
	Pesticides/PCBs	ND	-
WF031	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	05G00801
	Bis(2-ethylhexyl)phthalate	3 ug/L	05G00802 05G00901 05G00902
	Di-n-butylphthalate	2 ug/L	05G01001
	Bis(2-ethylhexyl)phthalate	2 ug/L	05G00301 05R01901 05G01001D
	Di-n-butylphthalate	2 ug/L	05G00101 33G00501 33G00201 33G00101 33G00301 33G00301D
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF031B	Volatiles Semivolatiles Pesticides/PCBs	ND ND ND	- - -
WF032	Volatiles <u>Semivolatiles</u> Di-n-butylphthalate	ND 1 ug/L	- 33G00401 06G00102 06G00101 06G00301 06R02001 29G00501 29G00501D
	Di-n-butylphthalate	3 ug/L	29G00101 66G01201 66G00102
	Pesticides/PCBs	ND	-
WF033	Volatiles Semivolatiles Pesticides/PCBs	ND ND ND	- - -
WF034	Volatiles <u>Semivolatiles</u> Bis(2-ethylhexyl)phthalate	ND 2 ug/L	- 66G01101 66G01301 66G00501
	Pesticides/PCBs	ND	-
WF035	Volatiles Semivolatiles Pesticides/PCBs	ND ND ND	- - -
WF036	Volatiles <u>Semivolatiles</u> Di-n-butylphthalate	ND 2 ug/L	- 66G00701 54G00201 54G00101 31G00201 54R02401 54G00101D
	Pesticides/PCBs	ND	-
WF037	Volatiles <u>Semivolatiles</u> Di-n-butylphthalate	ND 4 ug/L	- All samples in SDG WF037
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF038	<u>Volatiles</u> Acetone	7 ug/Kg	36BO0101 36BO0102 36BO0103 36BO0201 36BO0202 36BO0203 36BO0301 36BO0302 36BO0303 36BO0303D 36BO0401 36BO0402 36BO0403 36BO0403D
WF039	<u>Volatiles</u> Acetone Methylene chloride	7 ug/Kg 4 ug/Kg	35BO0203D 35BO0102DL 35BO0105 35BO0201
WF040	<u>Volatiles</u> Acetone Bromomethane Acetone	3 ug/L 2 ug/L 3 ug/Kg	All water samples in SDG WF040 35BO0402 35BO0501 35BO0501DL 35BO0502 37BO0201 37BO0202 37BO0101 37BO0102 37BO0103 37BO0301 37BO0302 37BO0303 37BO0203D 37BO0103D
WF041	<u>Volatiles</u> Pesticides & PCBs <u>Semivolatiles</u> Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	ND ND 1 ug/L 2 ug/L	- 13G00301 13G00401
WF042	<u>Volatiles</u>	ND	-
WF043	<u>Volatiles</u> Acetone	6 ug/L	33T05301 06G00102 06G00301 33G00401
WF044	<u>Volatiles</u> Acetone	3 ug/L	66T05601 66G01201 66G01201D 66G00102 66G01301

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF044 cont.	Acetone	11 ug/L	66T05701 66G00401 66G02001 66T05801 66G00603 66G00603D 66G00604 66G00601 66G00602
WF045	<u>Volatiles</u> Acetone	5 ug/L	OWT05901 OWR03401 OWG00501 OWG00502 OWG00502D OWG00503 OWT06001 OWG00101 OWG00102 OWG00103 66T06101 66G02301 66G02302 66G02303
	Acetone	5 ug/L	OWT06201 OWG00302 OWG00302D OWG00303 OWG00301 OWT06401 OWT06401 DL OWG00401 OWG00201
	<u>Semivolatiles</u> Di-n-butylphthalate	2 ug/L	OWR03401 OWG00501 OWG00502 OWG00502D OWG00503
	Phenol	72 ug/L	OWG00101
	2-Chlorophenol	67 ug/L	OWG00102
	1,4-Dichlorobenzene	33 ug/L	OWG00103
	N-Nitroso-di-n-propylamine	49 ug/L	
	1,2,4-Trichlorobenzene	36 ug/L	
	4-Chloro-3-methylphenol	62 ug/L	
	Acenaphthylene	12 ug/L	
	Acenaphthene	39 ug/L	
	4-Nitrophenol	69 ug/L	
	2,4-Dinitrotoluene	43 ug/L	
	Pentachlorophenol	65 ug/L	
	Pyrene	42 ug/L	
	Di-n-butylphthalate	5 ug/L	66G02301 66G02302 66G02303
	Di-n-butylphthalate	4 ug/L	OWG00401 OWG00201
	Pesticides & PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF046	<u>Volatiles</u> 2-Butanone	4 ug/L	All samples in SDG WF046
	<u>Semivolatiles</u> Di-n-butylphthalate	3 ug/L	31R03301 31G00101 31G00101D
	Pesticides & PCBs	ND	-
WF047	<u>Volatiles</u> Acetone	4 ug/L	39W028 39W027 39W024 39W032 39W034D 39W031 39T10001 39W001 39W002 39W003 39W004 39W005
WF048	<u>Volatiles</u> 2-Butanone	4 ug/L	39R03401
	Acetone	3 ug/Kg	39D002
	2-Butanone	4 ug/Kg	39D001 39D007 39D023 39D026 39D016 39D013 39D019 39D018 39D018D 39D022
WF049	<u>Volatiles</u> 2-Butanone	4 ug/L	39U001
	Semivolatiles	ND	-
WF051	<u>Volatiles</u> 2-Butanone	4 ug/L	16T06801 16R03501
WF052	Volatiles	ND	-
WF053	<u>Volatiles</u> Methylene chloride	8 ug/L	15G00602D 15T07501 15G00401 15G00703 15G00703D 15G00501 15G00502 15G00503
WF054	<u>Volatiles</u> Acetone	4 ug/L	30T07701 30R03901 30G00302

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Compound	Concentration	Associated Samples
WF054 cont.	Methylene chloride	8 ug/L	15T07601 15G00801 15G00801D 15G00802 15R03801 15G00803 15G00303
WF055	Volatiles	ND	-

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	Parameter	Concentration	Qualifier	
WF022	Client ID: BKF01001 Laboratory ID: RB858010 Collection Date: 7/17/96 Type: Source blank			
	<u>Volatiles</u> Acetone	4 ug/L	10U ug/L ¹	
	<u>Semivolatiles</u> Di-n-butylphthalate	6 ug/L	None	
	Pesticides/PCBs	ND	None	
WF022	Client ID: BKR01001 Laboratory ID: RB858002 Collection Date: 7/16/96 Type: Equipment rinsate			
	Volatiles	ND	None	
	<u>Semivolatiles</u> Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	5 ug/L 2 ug/L	None None	
	Pesticides/PCBs	ND	None	
WF022	Client ID: BKT01001 Laboratory ID: RB858001 Collection Date: 7/16/96 Type: Trip blank			
	<u>Volatiles</u> Acetone	3 ug/L	10U ug/L ¹	
WF022	Client ID: 17T01101 Laboratory ID: RB873001 Collection Date: 7/18/96 Type: Trip blank			
	<u>Volatiles</u> Acetone	8 ug/L	10U ug/L ¹	
WF023	Client ID: 01R01101 Laboratory ID: RB887005 Collection Date: 7/23/96 Type: Equipment rinsate			
	<u>Volatiles</u> Acetone	4 ug/L	None	
	<u>Semivolatiles</u> Di-n-butylphthalate	6 ug/L	None	
	Pesticides/PCBs	ND	None	
WF023	Client ID: 01T01201 Laboratory ID: RB887001 Collection Date: 7/22/96 Type: Trip blank			
	<u>Volatiles</u> Methylene chloride Acetone	2 ug/L 3 ug/L	10U ug/L ¹ 10U ug/L ¹	

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF023	Client ID: 16T01301 Laboratory ID: RB887014 Collection Date: 7/25/96 Type: Trip blank		
	<u>Volatiles</u> Acetone	2 ug/L	None
WF024	Client ID: 18T01401 Laboratory ID: RB92001 Collection Date: 7/29/96 Type: Trip blank		
	<u>Volatiles</u> Methylene chloride Acetone Chloroform	2 ug/L 4 ug/L 1 ug/L	None 10U ug/L None
WF024	Client ID: 15R01201 Laboratory ID: RB920005 Collection Date: 7/31/96 Type: Equipment rinseate		
	<u>Volatiles</u> Acetone	6 ug/L	10U ug/L ¹
	<u>Semivolatiles</u> Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBs	ND	None
WF025	Client ID: 15R01301 Laboratory ID: RB956011 Collection Date: 8/7/96 Type: Equipment rinseate		
	<u>Volatiles</u>	ND	None
	<u>Semivolatiles</u> Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBs	ND	None
WF025	Client ID: 15T01501 Laboratory ID: RB956001 Collection Date: 8/5/96 Type: Trip blank		
	<u>Volatiles</u> Methylene chloride Acetone	2 ug/L 4 ug/L	None None
WF025	Client ID: 15T01601 Laboratory ID: RB956012 Collection Date: 8/8/96 Type: Trip blank		
	<u>Volatiles</u> Methylene chloride Acetone	1 ug/L 2 ug/L	None 10U ug/L

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF026	Client ID: 15T01701 Laboratory ID: RB980001 Collection Date: 8/12/96 Type: Trip blank		
	<u>Volatile</u> Methylene chloride	1 ug/L	None
WF026	Client ID: 16T01801 Laboratory ID: RB980015 Collection Date: 8/15/96 Type: Trip blank		
	<u>Volatile</u> Methylene chloride	1 ug/L	None
	Acetone	3 ug/L	10U ug/L ¹
WF026	Client ID: 15R01401 Laboratory ID: RB980012 Collection Date: 8/14/96 Type: Equipment rinsate		
	<u>Volatile</u> Acetone	6 ug/L	10U ug/L ¹
	<u>Semivolatile</u> Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBS	ND	None
WF027	Client ID: 16T01901 Laboratory ID: RC016001 Collection Date: 8/19/96 Type: Trip blank		
	<u>Volatile</u> Methylene chloride	5 ug/L	None
	Acetone	6 ug/L	None
WF027	Client ID: 66T02001 Laboratory ID: RC016014 Collection Date: 8/22/96 Type: Trip blank		
	<u>Volatile</u> Methylene chloride	3 ug/L	None
WF027	Client ID: 16R01501 Laboratory ID: RC016012 Collection Date: 8/21/96 Type: Equipment rinsate		
	<u>Volatile</u>	ND	None
	<u>Semivolatile</u> Di-n-butylphthalate	5 ug/L	None
	Pesticides/PCBs	ND	None

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	Parameter	Concentration	Qualifier	
WF028	Client ID: 11T02201 Laboratory ID: RC044008 Collection Date: 8/28/96 Type: Trip blank			
	<u>Volatiles</u>			
	Methylene chloride	2 ug/L	None	
	Acetone	8 ug/L	10U ug/L ¹	
WF028	Client ID: 10T02101 Laboratory ID: RC044001 Collection Date: 8/26/96 Type: Trip blank			
	<u>Volatiles</u>			
	Methylene chloride	2 ug/L	None	
WF028	Client ID: 11R01601 Laboratory ID: RC044016 Collection Date: 8/28/96 Type: Equipment rinsate			
	<u>Volatiles</u>			
	Acetone	9 ug/L	10U ug/L ¹	
	<u>Semivolatiles</u>			
	Di-n-butylphthalate	5 ug/L	None	
	Pesticides/PCBs	ND	None	
WF029	Client ID: 13R01701 Laboratory ID: RC092008 Collection Date: 9/11/96 Type: Equipment rinsate			
	<u>Volatiles</u>			
	Acetone	3 ug/L	10U ug/L ¹	
	<u>Semivolatiles</u>			
	Di-n-butylphthalate	5 ug/L	None	
	Bis(2-ethylhexyl)phthalate	1 ug/L	10U ug/L ¹	
	Pesticides/PCBs	ND	None	
WF029	Client ID: 13T02301 Laboratory ID: RC092001 Collection Date: 9/9/96 Type: Trip blank			
	<u>Volatiles</u>			
	Methylene chloride	1 ug/L	None	
	Acetone	2 ug/L	10U ug/L ¹	
WF029	Client ID: 66T02401 Laboratory ID: RC092011 Collection Date: 9/12/96 Type: Trip blank			
	<u>Volatiles</u>			
	Methylene chloride	3 ug/L	None	
	Acetone	3 ug/L	10U ug/L ¹	

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	Parameter	Concentration	Qualifier	
WF030	Client ID: 66R01801 Laboratory ID: RC121010 Collection Date: 9/18/96 Type: Equipment rinsate			
	<u>Volatiles</u> Acetone	4 ug/L	None	
	<u>Semivolatiles</u> Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	3 ug/L 1 ug/L	None 10U ug/L ¹	
	Pesticides/PCBs	ND	None	
WF030	Client ID: 66T02501 Laboratory ID: RC121001 Collection Date: 9/16/96 Type: Trip blank			
	<u>Volatiles</u> Methylene chloride Acetone	3 ug/L 3 ug/L	None 10U ug/L ¹	
WF030	Client ID: 66T02601 Laboratory ID: RC121012 Collection Date: 9/19/96 Type: Trip blank			
	<u>Volatiles</u> Methylene chloride Acetone	3 ug/L 3 ug/L	None None	
WF031	Client ID: 05T02701 Laboratory ID: MB928001 Collection Date: 9/23/96 Type: Trip blank			
	<u>Volatiles</u> Methylene chloride	2 ug/L	None	
WF031	Client ID: 33T02801 Laboratory ID: MB958001 Collection Date: 9/26/96 Type: Trip blank			
	<u>Volatiles</u> Methylene chloride	3 ug/L	None	
WF031	Client ID: 05R01901 Laboratory ID: MB928011 Collection Date: 9/25/96 Type: Equipment rinsate			
	<u>Volatiles</u>	ND	None	
	<u>Semivolatiles</u> Di-n-butylphthalate	2 ug/L	10U ug/L ¹	
	Pesticides/PCBs	ND	None	

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF031B	Client ID: 16T04001 Laboratory ID: MC447002 Collection Date: 11/21/96 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF032	Client ID: 06T02901 Laboratory ID: MC011001 Collection Date: 9/30/96 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF032	Client ID: 29T03001 Laboratory ID: MC037001 Collection Date: 10/3/96 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF032	Client ID: 06R02001 Laboratory ID: MC011006 Collection Date: 10/2/96 Type: Equipment rinsate		
	<u>Volatiles</u>	ND	None
	<u>Semivolatiles</u>		
	Di-n-butylphthalate	3 ug/L	100 ug/L ¹
	<u>Pesticides/PCBs</u>	ND	None
WF033	Client ID: 29T03101 Laboratory ID: MC085001 Collection Date: 10/7/96 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF033	Client ID: 66T03201 Laboratory ID: MC118001 Collection Date: 10/10/96 Type: Trip blank		
	<u>Volatiles</u>		
	Acetone	26 ug/L	None
WF033	Client ID: 66R02101 Laboratory ID: MC02101 Collection Date: 10/9/96 Type: Equipment rinsate		
	<u>Volatiles</u>		
	Methylene chloride	1 ug/L	None
	<u>Semivolatiles</u>		
	Di-n-butylphthalate	6 ug/L	None
	<u>Pesticides/PCBs</u>	ND	None

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF034	Client ID: 66T03301 Laboratory ID: MC153001 Collection Date: 10/14/96 Type: Trip blank		
	Volatiles	ND	None
WF034	Client ID: 66T03401 Laboratory ID: MC176001 Collection Date: 10/17/96 Type: Trip blank		
	Volatiles	ND	None
WF034	Client ID: 66R02201 Laboratory ID: MC153007 Collection Date: 10/16/96 Type: Equipment rinsate		
	<u>Volatiles</u> Toluene Ethylbenzene Xylenes (total)	8 ug/L 1 ug/L 2 ug/L	None None None
	<u>Semivolatiles</u> Di-n-butylphthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF035	Client ID: 66T03501 Laboratory ID: MC214001 Collection Date: 10/21/96 Type: Trip blank		
	Volatiles	ND	None
WF035	Client ID: 66T03601 Laboratory ID: MC231001 Collection Date: 10/24/96 Type: Trip blank		
	Volatiles	ND	None
WF035	Client ID: 66R02301 Laboratory ID: MC214006 Collection Date: 10/23/96 Type: Equipment rinsate		
	Volatiles	ND	None
	<u>Semivolatiles</u> Di-n-butylphthalate	3 ug/L	None
	Pesticides/PCBs	ND	None
WF036	Client ID: 66T03701 Laboratory ID: MC262001 Collection Date: 10/28/96 Type: Trip blank		
	Volatiles	ND	None

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF036	Client ID: 31T03801 Laboratory ID: MC284001 Collection Date: 10/31/96 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF036	Client ID: 54R02401 Laboratory ID: MC262007 Collection Date: 10/30/96 Type: Equipment rinsate		
	<u>Volatiles</u>	ND	None
	<u>Semivolatiles</u>		
	Di-n-butylphthalate	4 ug/L	10U ug/L ¹
	<u>Pesticides/PCBs</u>	ND	ND
WF037	Client ID: 15T03901 Laboratory ID: MC424001 Collection Date: 11/18/96 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF037	Client ID: 16T04001 Laboratory ID: MC448004 Collection Date: 11/21/96 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF037	Client ID: 15R02501 Laboratory ID: MC424009 Collection Date: 11/20/96 Type: Equipment rinsate		
	<u>Volatiles</u>	ND	None
WF037	Client ID: 15F00201 Laboratory ID: MC424010 Collection Date: 11/20/96 Type: Source blank		
	<u>Volatiles</u>		
	Xylenes (total)	2 ug/L	None
	<u>Semivolatiles</u>		
	Di-n-butylphthalate	4 ug/L	10U ug/L ¹
	<u>Pesticides/PCBs</u>	ND	None
WF038	Client ID: 36R02601 Laboratory ID: MC687016 Collection Date: 12/18/96 Type: Rinsate		
	<u>Volatiles</u>	ND	None

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF038	Client ID: 36TO4101 Laboratory ID: MC687001 Collection Date: 12/17/96 Type: Trip Blank		
	<u>Volatiles</u>	ND	None
WF039	Client ID: 35TO4201 Laboratory ID: MC698001 Collection Date: 12/19/97 Type: Trip Blank		
	<u>Volatiles</u>	ND	None
WF039	Client ID: 35RO2701 Laboratory ID: MC698011 Collection Date: 12/21/96 Type: Equipment rinsate		
	<u>Volatiles</u>	ND	None
WF040	Client ID: 35TO4301 Laboratory ID: MC783001 Collection Date: 1/7/97 Type: Trip blank		
	<u>Bromomethane</u>	1 ug/L	10U ug/L ¹
WF040	Client ID: 37RO2801 Laboratory ID: MC783017 Collection Date: 1/9/97 Type: Equipment rinsate		
	<u>Volatiles</u>		
	Acetone	5 ug/L	10U ug/L ¹
	Carbon disulfide	2 ug/L	None
WF041	Client ID: 35TO4501 Laboratory ID: MD908001 Collection Date: 6/11/97 Type: Trip blank		
	<u>Volatiles</u>		
	Acetone	6 ug/L	None
WF041	Client ID: 37TO4601 Laboratory ID: MD926001 Collection Date: 6/12/97 Type: Trip blank		
	<u>Volatiles</u>		
	Methylene chloride	1 ug/L	None
WF041	Client ID: 35TO4701 Laboratory ID: MD950001 Collection Date: 6/15/97 Type: Trip blank		
	<u>Volatiles</u>		
	Methylene chloride	3 ug/L	None
	Xylene (total)	1 ug/L	None

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	Parameter	Concentration	Qualifier	
WF041	Client ID: 13T04801 Laboratory ID: MD985001 Collection Date: 6/16/97 Type: Trip blank			
	<u>Volatiles</u>			
	Methylene chloride	2 ug/L	None	
	Acetone	6 ug/L	None	
WF041	Client ID: 35F00301 Laboratory ID: MD908002 Collection Date: 6/11/97 Type: Source blank			
	<u>Semivolatiles</u>			
	Di-n-butylphthalate	3 ug/L	None	
	<u>Pesticides & PCBs</u>	ND	-	
WF041	Client ID: 35R03001 Laboratory ID: MD908003 Collection Date: 6/11/97 Type: Equipment rinsate			
	<u>Semivolatiles</u>			
	Di-n-butylphthalate	4 ug/L	None	
	Bis(2-ethylhexyl)phthalate	8 ug/L	None	
	<u>Pesticides & PCBs</u>	ND	None	
WF042	Client ID: 05T04901 Laboratory ID: ME007001 Collection Date: 6/18/97 Type: Trip blank			
	<u>Volatiles</u>	ND	None	
WF042	Client ID: 05T05001 Laboratory ID: ME021001 Collection Date: 6/20/97 Type: Trip blank			
	<u>Volatiles</u>			
	Acetone	2 ug/L	None	
WF042	Client ID: 05R03101 Laboratory ID: ME007006 Collection Date: 6/17/97 Type: Equipment rinsate			
	<u>Volatiles</u>	ND	None	
WF043	Client ID: 05R03201 Laboratory ID: ME042002 Collection Date: 6/23/97 Type: Equipment rinsate			
	<u>Volatiles</u>			
	1,2-Dichloropropane	1 ug/L	None	

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Summary of Field Blank Contamination
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NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF043	Client ID: 05T05101 Laboratory ID: MW042001 Collection Date: 6/23/97 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF043	Client ID: 33T05201 Laboratory ID: MW053001 Collection Date: 6/24/97 Type: Trip blank		
	<u>Volatiles</u>		
	Acetone	3 ug/L	None
WF043	Client ID: 33T05301 Laboratory ID: ME073001 Collection Date: 6/25/97 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF043	Client ID: 30T05401 Laboratory ID: ME087001 Collection Date: 6/26/97 Type: Trip blank		
	<u>Volatiles</u>		
	Acetone	4 ug/L	None
WF044	Client ID: 06R03301 Laboratory ID: ME100002 Collection Date: 6/29/97 Type: Equipment rinsate		
	<u>Volatiles</u>		
	Acetone	7 ug/L	None
	Trichloroethene	6 ug/L	None
	Toluene	3 ug/L	None
	Ethylbenzene	1 ug/L	None
	Xylene (total)	2 ug/L	None
WF044	Client ID: 06T05501 Laboratory ID: ME100001 Collection Date: 6/29/97 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF044	Client ID: 66T05601 Laboratory ID: ME110001 Collection Date: 6/30/97 Type: Trip blank		
	<u>Volatiles</u>		
	Acetone	5 ug/L	100 ug/L ¹
WF044	Client ID: 66T05701 Laboratory ID: ME133001 Collection Date: 7/2/97 Type: Trip blank		
	<u>Volatiles</u>	ND	None

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF044	Client ID: 66T05801 Laboratory ID: ME135001 Collection Date: 7/2/97 Type: Trip blank		
	<u>Volatiles</u> Acetone	3 ug/L	10U ug/L
WF045	Client ID: OWR03401 Laboratory ID: ME149002 Collection Date: 7/7/97 Type: Equipment rinsate		
	<u>Volatiles</u> Acetone 1,2-Dichloropropane	3 ug/L 1 ug/L	10U ug/L None
	<u>Semivolatiles</u> Di-n-butylphthalate	5 ug/L	10U ug/L
	Pesticides & PCBs	ND	None
WF045	Client ID: OWT05901 Laboratory ID: ME149001 Collection Date: 7/7/97 Type: Trip blank		
	<u>Volatiles</u> Acetone	2 ug/L	10U ug/L
WF045	Client ID: OWT06001 Laboratory ID: ME159001 Collection Date: 7/8/97 Type: Trip blank		
	Volatiles	ND	None
WF045	Client ID: 66T06101 Laboratory ID: ME175001 Collection Date: 7/9/97 Type: Trip blank		
	<u>Volatiles</u> Acetone	2 ug/L	10U ug/L
WF045	Client ID: OWT06201 Laboratory ID: ME190001 Collection Date: 7/10/97 Type: Trip blank		
	Volatiles	ND	None
WF045	Client ID: OWT06401 Laboratory ID: ME226001 Collection Date: 7/14/97 Type: Trip blank		
	<u>Volatiles</u> Acetone	250 ug/L	None

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Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF045	Client ID: OWT06401DL Laboratory ID: ME226001DL Collection Date: 7/14/97 Type: Trip blank		
	<u>Volatile</u> Acetone	250 ug/L	None
WF046	Client ID: 31R03301 Laboratory ID: MW241002 Collection Date: 7/15/97 Type: Equipment rinsate		
	<u>Volatile</u> 1,2-Dichloropropane	1 ug/L	None
	<u>Semivolatile</u> Di-n-butylphthalate	12 ug/L	120 ug/L
	Pesticides & PCBs	ND	None
WF046	Client ID: 31T06501 Laboratory ID: ME241001 Collection Date: 7/15/97 Type: Trip blank		
	<u>Volatile</u> Acetone	4 ug/L	None
WF046	Client ID: 31T06601 Laboratory ID: ME261001 Collection Date: 7/16/97 Type: Trip blank		
	<u>Volatile</u> Toluene	1 ug/L	None
WF046	Client ID: 31T06701 Laboratory ID: ME305001 Collection Date: 7/21/97 Type: Trip blank		
	<u>Volatile</u> Methylene chloride	1 ug/L	None
WF047	Client ID: STOR_BLK Laboratory ID: ME243008 Collection Date: 7/15/97 Type: Storage blank		
	<u>Volatile</u>	ND	None
WF047	Client ID: STOR_BLK2 Laboratory ID: ME267008 Collection Date: 7/16/97 Type: Storage blank		
	<u>Volatile</u> Acetone Toluene	4 ug/L 0.4 ug/L	None None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF047	Client ID: 39T10001 Laboratory ID: ME244001 Collection Date: 7/15/97 Type: Trip blank		
	<u>Volatiles</u> Carbon disulfide Toluene	0.40 ug/L 0.50 ug/L	None None
WF048	Client ID: 39R03401 Laboratory ID: ME264009 Collection Date: 7/17/97 Type: Equipment rinsate		
	<u>Volatiles</u> 1,2-Dichloropropane	1 ug/L	None
WF049	Client ID: 39T10201 Laboratory ID: ME262001 Collection Date: 7/15/97 Type: Trip blank		
	<u>Volatiles</u> Toluene	0.90 ug/L	None
WF049	Client ID: 39T10401 Laboratory ID: ME263007 Collection Date: 7/17/97 Type: Trip blank		
	<u>Volatiles</u> Toluene	0.40 ug/L	None
WF051	Client ID: 16R03501 Laboratory ID: ME306002 Collection Date: 7/21/97 Type: Equipment rinsate		
	<u>Volatiles</u> Methylene chloride	1 ug/L	None
WF051	Client ID: 16T06801 Laboratory ID: ME306001 Collection Date: 7/21/97 Type: Trip blank		
	<u>Volatiles</u> Methylene chloride Acetone	1 ug/L 3 ug/L	None None
WF051	Client ID: 16T06901 Laboratory ID: ME322001 Collection Date: 7/22/97 Type: Trip blank		
	<u>Volatiles</u>	ND	None
WF051	Client ID: 16T07001 Laboratory ID: ME340001 Collection Date: 7/23/97 Type: Trip blank		
	<u>Volatiles</u>	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF051	Client ID: 16T07101 Laboratory ID: ME348001 Collection Date: 7/25/97 Type: Trip blank		
	Volatiles	ND	None
WF052	Client ID: STORAGEBLK Laboratory ID: ME346008 Collection Date: 7/25/97 Type: Storage blank		
	Volatiles Methylene chloride Acetone	1 ug/L 3 ug/L	None None
WF052	Client ID: 39T10501 Laboratory ID: ME346007 Collection Date: 7/25/97 Type: Trip blank		
	Volatiles	ND	None
WF053	Client ID: 15R03701 Laboratory ID: ME367002 Collection Date: 7/27/97 Type: Equipment rinsate		
	Volatiles	ND	None
WF053	Client ID: 15T07201 Laboratory ID: ME367001 Collection Date: 7/27/97 Type: Trip blank		
	Volatiles	ND	None
WF053	Client ID: 15T07301 Laboratory ID: ME377001 Collection Date: 7/28/97 Type: Trip blank		
	Volatiles	ND	None
WF053	Client ID: 15T07401 Laboratory ID: ME390001 Collection Date: 7/29/97 Type: Trip blank		
	Volatiles	ND	None
WF053	Client ID: 15T07501 Laboratory ID: ME404001 Collection Date: 7/30/97 Type: Trip blank		
	Volatiles	ND	None
WF054	Client ID: 15R03801 Laboratory ID: ME441005 Collection Date: 8/5/97 Type: Equipment rinsate		
	Volatiles	ND	None

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Summary of Field Blank Contamination
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NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	Parameter	Concentration	Qualifier
WF054	Client ID: 30R03901 Laboratory ID: ME450002 Collection Date: 8/6/97 Type: Equipment rinseate <u>Volatiles</u> 1,2-Dichloropropane	1 ug/L	None
WF054	Client ID: 15T07601 Laboratory ID: ME441001 Collection Date: 8/4/97 Type: Trip blank Volatiles	ND	None
WF054	Client ID: 30T07701 Laboratory ID: ME450001 Collection Date: 8/5/97 Type: Trip blank Volatiles	ND	None
WF055	Client ID: OWR04101 Laboratory ID: MF004002 Collection Date: 10/27/97 Type: Equipment rinseate Volatiles	ND	None
WF055	Client ID: 13R04201 Laboratory ID: MF004005 Collection Date: 10/28/97 Type: Equipment rinseate Volatiles	ND	None
WF055	Client ID: OWT08001 Laboratory ID: MF004001 Collection Date: 10/27/97 Type: Trip blank Volatiles	ND	None
' = sample result was modified based on an associated method blank concentration. Note: see detailed data validation report for the discrete qualifiers.			

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes								
SDG	Client ID	Analyte	Criteria		% Recovery		RPD/Difference	Qualifier
			% Recovery	Difference	MS	MSD		
WF022	BKG00101	Metals Cyanide	-	-	-	-	-	None None
WF023	02G00301	Metals Cyanide	-	-	-	-	-	None None
WF024	15G00701	Metals Cyanide	-	-	-	-	-	None None
WF025	15G00601	Metals Cyanide	-	-	-	-	-	None None
WF026	15G00803	Metals Cyanide	-	-	-	-	-	None None
WF027	16G00501	Metals Cyanide	-	-	-	-	-	None None
WF028	12G00101	Metals Cyanide	-	-	-	-	-	None None
WF029	14G00101	Metals Cyanide	-	-	-	-	-	None None
WF030	66G00601	Metals Cyanide	-	-	-	-	-	None None
WF031	05G01001	Iron Lead Sodium Zinc Cyanide	- 75-125	±100 ±3.0 ±5000 ±20.0	- 3.7	-	124.8 ug/L 9.2 ug/L 5978 ug/L 174 ug/L	J J J J J (det) R (ND)
WF031B	None	Metals Cyanide	-	-	-	-	-	None None
WF032	29G00501	Metals Cyanide	-	-	-	-	-	None None
WF033	66G00201	Metals Cyanide	-	-	-	-	-	None None

T. X

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes								
SDG	Client ID	Analyte	Criteria		% Recovery		RPD/Difference	Qualifier
			% Recovery	Difference	MS	MSD		
WF034	30G00301	Antimony Cyanide	75-125	-	126.7	-	-	J (all detects) None
WF035	66G01701	Metals Cyanide	-	-	-	-	-	None None
WF036	54G00101	Metals Cyanide	-	-	-	-	-	None None
WF037	15F00201	Metals Cyanide	75-125	-	3.7	-	-	None J (det) R (ND)
WF041	35G00101	Aluminum Iron Manganese Cyanide	-	≤100 ≤100 ≤10	-	-	402 ug/L 309 ug/L 75.2 ug/L	J J J None
WF045	OWG00502	Metals Cyanide	-	-	-	-	-	None None
WF046	31G00101	Metals Cyanide	-	-	-	-	-	None None
WF047	39W034	Metals	-	-	-	-	-	None
WF051	None	Metals	-	-	-	-	-	None
WF053	15G00602	Metals	-	-	-	-	-	None
WF054	15G00801	Metals	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF022	Client ID Laboratory ID Collection Date	BKG00101 RB858003 7/16/96	BKG00101D RB858004 7/16/96	
	Aluminum	43.4 ug/L	54.4 ug/L	22
	Barium	15.6 ug/L	15.6 ug/L	0
	Calcium	536 ug/L	558 ug/L	4
	Iron	54.0 ug/L	57.9 ug/L	7
	Lead	ND	0.80 ug/L	Not calculable
	Magnesium	499 ug/L	521 ug/L	4
	Manganese	1.7 ug/L	1.9 ug/L	11
	Selenium	0.67 ug/L	ND	Not calculable
	Sodium	1080 ug/L	1080 ug/L	0
	Zinc	2.4 ug/L	ND	Not calculable
	Cyanide	3.8 ug/L	6.5 ug/L	52
WF022	Client ID Laboratory ID Collection Date	01G00102 RB873008 7/19/96	01G00102D RB873009 7/19/96	
	Aluminum	19.1 ug/L	10.3 ug/L	50
	Barium	15.6 ug/L	15.6 ug/L	0
	Beryllium	0.53 ug/L	ND	Not calculable
	Calcium	5850 ug/L	6250 ug/L	7
	Copper	ND	1.4 ug/L	Not calculable
	Iron	12.2 ug/L	8.8 ug/L	32
	Lead	1.3 ug/L	1.5 ug/L	14
	Magnesium	337 ug/L	331 ug/L	2
	Manganese	6.7 ug/L	9.0 ug/L	29
	Potassium	938 ug/L	842 ug/L	11
	Sodium	2100 ug/L	2070 ug/L	1
	Vanadium	ND	1.6 ug/L	Not calculable
	Zinc	10.2 ug/L	11.4 ug/L	11
	Cyanide	1.9 ug/L	ND	Not calculable
WF023	Client ID Laboratory ID Collection Date	02G00301 RB887012 7/24/96	02G00301D RB887013 7/24/96	
	Aluminum	79.3 ug/L	84.6 ug/L	6
	Barium	128 ug/L	129 ug/L	0.8
	Beryllium	0.39 ug/L	ND	Not calculable
	Calcium	113000 ug/L	113000 ug/L	0
	Iron	36.2 ug/L	38.7 ug/L	7
	Lead	1.4 ug/L	1.3 ug/L	7
	Magnesium	9560 ug/L	9590 ug/L	0.3
	Manganese	13.5 ug/L	13.7 ug/L	1
	Nickel	7.8 ug/L	9.6 ug/L	21
	Potassium	4610 ug/L	4580 ug/L	0.7
	Selenium	1.2 ug/L	0.66 ug/L	58
	Sodium	2200 ug/L	2240 ug/L	2
	Vanadium	3.0 ug/L	2.8 ug/L	7
	Zinc	1.8 ug/L	2.0 ug/L	11
	Cyanide	4.5 ug/L	2.0 ug/L	77

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF024	Client ID Laboratory ID Collection Date	15G00701 RB920009 7/31/96	15G00701D RB950010 7/31/96	
	Aluminum	161 ug/L	173 ug/L	7
	Barium	15.6 ug/L	19.3 ug/L	21
	Calcium	356 ug/L	360 ug/L	1
	Chromium	2.9 ug/L	2.0 ug/L	57
	Iron	183 ug/L	202 ug/L	10
	Lead	0.70 ug/L	0.60 ug/L	15
	Magnesium	433 ug/L	422 ug/L	3
	Manganese	2.8 ug/L	2.6 ug/L	7
	Sodium	1530 ug/L	1610 ug/L	5
	Vanadium	ND	1.2 ug/L	
	Zinc	3.4 ug/L	3.6 ug/L	6
	Cyanide	2.6 ug/L	3.2 ug/L	21
				Not calculable
WF025	Client ID Laboratory ID Collection Date	15G00601 RB956006 8/7/96	15G00601D RB956008 8/7/96	
	Aluminum	89.4 ug/L	55.8 ug/L	46
	Arsenic	8.0 ug/L	7.8 ug/L	2
	Barium	67.6 ug/L	63.7 ug/L	6
	Calcium	3690 ug/L	3620 ug/L	2
	Iron	31000 ug/L	30500 ug/L	2
	Lead	0.90 ug/L	0.50 ug/L	
	Magnesium	1940 ug/L	1900 ug/L	2
	Manganese	139 ug/L	136 ug/L	2
	Potassium	2460 ug/L	2340 ug/L	5
	Sodium	2630 ug/L	2590 ug/L	2
	Zinc	3.4 ug/L	3.3 ug/L	3
	Cyanide	1.5 ug/L	8.1 ug/L	
				Not calculable
WF026	Client ID Laboratory ID Collection Date	15G00803 RB980007 8/14/96	15G00803D RB980008 8/14/96	
	Aluminum	187 ug/L	146 ug/L	25
	Barium	10.6 ug/L	10.8 ug/L	2
	Calcium	1440 ug/L	1170 ug/L	21
	Chromium	2.9 ug/L	2.0 ug/L	
	Cobalt	2.3 ug/L	2.4 ug/L	
	Copper	4.0 ug/L	2.4 ug/L	50
	Iron	194 ug/L	175 ug/L	10
	Lead	0.80 ug/L	0.50 ug/L	46
	Magnesium	322 ug/L	296 ug/L	8
	Manganese	33.1 ug/L	32.9 ug/L	0.6
	Potassium	522 ug/L	316 ug/L	
	Sodium	5350 ug/L	5380 ug/L	0.6
	Vanadium	2.0 ug/L	1.5 ug/L	29
	Zinc	176 ug/L	178 ug/L	1
	Cyanide	1.6 ug/L	4.2 ug/L	90
				Not calculable

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF026	Client ID Laboratory ID Collection Date	16G00403 RB980020 8/16/96	16G00403D RB980021 8/16/96	
	Aluminum	278 ug/L	290 ug/L	4
	Arsenic	1.0 ug/L	0.50U ug/L	Not calculable
	Barium	28.6 ug/L	27.5 ug/L	4
	Calcium	3110 ug/L	3300 ug/L	6
	Chromium	2.3 ug/L	2.9 ug/L	23
	Copper	1.1U ug/L	1.3 ug/L	Not calculable
	Iron	1370 ug/L	879 ug/L	44
	Lead	4.0 ug/L	2.7 ug/L	39
	Magnesium	1320 ug/L	987 ug/L	29
	Manganese	41.3 ug/L	33.5 ug/L	21
	Potassium	540 ug/L	713 ug/L	28
	Sodium	2570 ug/L	2590 ug/L	0.8
	Vanadium	2.2 ug/L	1.2U ug/L	Not calculable
	Zinc	103 ug/L	945 ug/L	161
	Cyanide	2.9 ug/L	1.6 ug/L	58
WF027	Client ID Laboratory ID Collection Date	16G00501 RC016009 8/21/96	16G00501D RC016013 8/21/96	
	Aluminum	12.6 ug/L	16.7 ug/L	28
	Barium	10 ug/L	10 ug/L	0
	Calcium	239 ug/L	234 ug/L	2
	Cobalt	3.2 ug/L	2.3U ug/L	Not calculable
	Iron	9.2 ug/L	5.3 ug/L	54
	Magnesium	276 ug/L	261 ug/L	6
	Manganese	1.0U ug/L	2.1 ug/L	Not calculable
	Sodium	1550 ug/L	1450 ug/L	7
	Zinc	2.6 ug/L	1.6 ug/L	48
WF027	Client ID Laboratory ID Collection Date	09G00301 RC016019 8/23/96	09G00301D RC016020 8/23/96	
	Aluminum	407 ug/L	372 ug/L	9
	Antimony	8.6U ug/L	9.3 ug/L	Not calculable
	Arsenic	2.6 ug/L	2.8 ug/L	7
	Barium	27.1 ug/L	25.8 ug/L	5
	Calcium	15300 ug/L	14600 ug/L	5
	Chromium	4.0 ug/L	2.4 ug/L	50
	Iron	173 ug/L	148 ug/L	16
	Lead	0.50U ug/L	0.60 ug/L	Not calculable
	Magnesium	158 ug/L	160 ug/L	1
	Manganese	1.5 ug/L	1.7 ug/L	12
	Potassium	2390 ug/L	2010 ug/L	17
	Sodium	2070 ug/L	1950 ug/L	6
	Vanadium	16.4 ug/L	14.3 ug/L	14
	Zinc	14.8 ug/L	1.2 ug/L	170

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF028	Client ID Laboratory ID Collection Date	12G00101 RC044012 8/27/96	12G00101D RC044017 8/27/96	
	Aluminum	14.0 ug/L	15.1 ug/L	8
	Barium	14.5 ug/L	14.5 ug/L	0
	Calcium	1840 ug/L	1870 ug/L	2
	Lead	0.60 ug/L	0.50U ug/L	Not calculable
	Magnesium	320 ug/L	327 ug/L	2
	Manganese	1.0U ug/L	1.4 ug/L	Not calculable
	Potassium	2220 ug/L	2290 ug/L	3
	Sodium	2310 ug/L	2360 ug/L	2
	Thallium	0.70 ug/L	0.60U ug/L	Not calculable
	Zinc	6.7 ug/L	5.5 ug/L	20
	Cyanide	1.8U ug/L	2.1 ug/L	Not calculable
WF028	Client ID Laboratory ID Collection Date	11G00201 RC044011 8/28/96	11G00201D RC044018 8/28/96	
	Aluminum	2770 ug/L	2320 ug/L	18
	Arsenic	1.7 ug/L	2.0 ug/L	16
	Barium	50.3 ug/L	51.6 ug/L	3
	Beryllium	0.40 ug/L	0.30U ug/L	Not calculable
	Calcium	35400 ug/L	41800 ug/L	17
	Chromium	20.4 ug/L	19.2 ug/L	6
	Copper	2.0 ug/L	3.1 ug/L	43
	Iron	232 ug/L	337 ug/L	37
	Lead	0.50U ug/L	0.90 ug/L	Not calculable
	Magnesium	388 ug/L	538 ug/L	32
	Manganese	2.2 ug/L	4.8 ug/L	74
	Potassium	12900 ug/L	9610 ug/L	29
	Sodium	3420 ug/L	2950 ug/L	15
	Vanadium	11.0 ug/L	11.0 ug/L	0
	Zinc	3.4 ug/L	24.3 ug/L	151
	Cyanide	1.5U ug/L	3.3 ug/L	Not calculable
WF029	Client ID Laboratory ID Collection Date	14G00101 RC092007 9/11/96	14G00101D RC092009 9/11/96	
	Aluminum	33.1 ug/L	26.5 ug/L	22
	Arsenic	0.50 ug/L	0.50U ug/L	Not calculable
	Barium	22.3 ug/L	22.3 ug/L	0
	Calcium -	3060 ug/L	2870 ug/L	6
	Iron	22.0 ug/L	27.3 ug/L	22
	Lead	1.3 ug/L	0.80 ug/L	48
	Magnesium	702 ug/L	691 ug/L	2
	Manganese	1.9 ug/L	1.9 ug/L	0
	Mercury	0.12 ug/L	0.10U ug/L	Not calculable
	Sodium	1590 ug/L	1570 ug/L	1
	Vanadium	1.2U ug/L	1.4 ug/L	Not calculable
	Zinc	89.5 ug/L	96.8 ug/L	8

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF030	Client ID Laboratory ID Collection Date	66G00601 RC121007 9/18/96	66G00601D RC121011 9/18/96	
	Aluminum	39.9 ug/L	39.7 ug/L	0.5
	Barium	38.1 ug/L	36.2 ug/L	5
	Calcium	863 ug/L	770 ug/L	11
	Copper	1.8 ug/L	1.1 ug/L	Not calculable
	Iron	8.2 ug/L	41.9 ug/L	134
	Lead	0.90 ug/L	0.50U ug/L	Not calculable
	Magnesium	1130 ug/L	1110 ug/L	2
	Manganese	5.0 ug/L	4.6 ug/L	8
	Potassium	860 ug/L	689 ug/L	22
	Selenium	0.64 ug/L	0.60U ug/L	Not calculable
	Sodium	1280 ug/L	1160 ug/L	10
	Zinc	2.9 ug/L	4.8 ug/L	49
WF030	Client ID Laboratory ID Collection Date	66G02203 RC121016 9/20/96	66G02203D RC121017 9/20/96	
	Aluminum	44.0 ug/L	51.9 ug/L	16
	Barium	6.4 ug/L	6.4 ug/L	0
	Calcium	751 ug/L	731 ug/L	3
	Cobalt	2.3U ug/L	2.4 ug/L	Not calculable
	Iron	35.6 ug/L	38.9 ug/L	9
	Magnesium	271 ug/L	242 ug/L	11
	Manganese	9.7 ug/L	9.7 ug/L	0
	Potassium	491 ug/L	316U ug/L	Not calculable
	Sodium	2810 ug/L	2760 ug/L	2
	Zinc	1.2 ug/L	2.2 ug/L	59
	Cyanide	1.8U ug/L	12.0 ug/L	Not calculable
WF031	Client ID Laboratory ID Collection Date	05G01001 MB928007 9/25/96	05G01001D MB928012 9/25/96	
	Barium	27.6 ug/L	27.1 ug/L	2
	Calcium	854 ug/L	803 ug/L	6
	Chromium	0.61 ug/L	0.36 ug/L	52
	Cobalt	0.85 ug/L	0.72 ug/L	17
	Copper	35.6 ug/L	1.7U ug/L	Not calculable
	Iron	40.1 ug/L	31.8U ug/L	Not calculable
	Lead	4.4 ug/L	1.8U ug/L	Not calculable
	Magnesium	874 ug/L	871 ug/L	0.6
	Manganese	3.3 ug/L	2.5 ug/L	28
	Mercury	0.03 ug/L	0.04 ug/L	29
	Nickel	1.4 ug/L	1.4 ug/L	0
	Potassium	3.1U ug/L	825 ug/L	Not calculable
	Selenium	5.4 ug/L	3.9U ug/L	Not calculable
	Sodium	15100 ug/L	14900 ug/L	1
	Thallium	7.4 ug/L	1.9U ug/L	Not calculable
	Vanadium	0.58U ug/L	0.63 ug/L	Not calculable
	Zinc	13.7 ug/L	3.8 ug/L	113

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF031	Client ID Laboratory ID Collection Date	33G00301 MB958006 9/27/96	33G00301D MB958007 9/27/96	
	Aluminum	156	98.7	45
	Antimony	3.5	3.4U	Not calculable
	Barium	59.3	59.9	1
	Calcium	2230	2230	0
	Chromium	0.88	0.34U	Not calculable
	Cobalt	0.70	0.49	35
	Iron	107	50.6	72
	Magnesium	1750	1760	0.6
	Manganese	21.2	21.5	1
	Potassium	31.8	1040	186
	Sodium	5370	5550	3
	Thallium	2.9	3.4	16
	Vanadium	1.0	0.58U	Not calculable
	Zinc	7.4	7.2	3
WF032	Client ID Laboratory ID Collection Date	29G00501 MC011007 10/2/96	29G00501D MC011008 10/2/96	
	Barium	89.7 ug/L	84.2 ug/L	6
	Beryllium	0.14 ug/L	0.19 ug/L	30
	Calcium	1580 ug/L	1470 ug/L	7
	Chromium	2.1 ug/L	2.8 ug/L	29
	Cobalt	0.94 ug/L	0.98 ug/L	4
	Copper	2.7 ug/L	4.4 ug/L	48
	Magnesium	2500 ug/L	2320 ug/L	7
	Manganese	8.4 ug/L	8.0 ug/L	5
	Mercury	0.04 ug/L	0.04 ug/L	0
	Sodium	5040 ug/L	5030 ug/L	0.2
	Zinc	5.1 ug/L	3.8 ug/L	29
	Cyanide	1.0 ug/L	1.2 ug/L	18
WF033	Client ID Laboratory ID Collection Date	66G00201 MC118002 10/9/96	66G00201D MC118003 10/9/96	
	Barium	20.8 ug/L	20.7 ug/L	0.5
	Calcium	3250 ug/L	3100 ug/L	5
	Chromium	0.75 ug/L	0.44 ug/L	52
	Copper	1.7U ug/L	2.7 ug/L	Not calculable
	Iron	73.8 ug/L	31.8U ug/L	Not calculable
	Magnesium	456 ug/L	457 ug/L	0.2
	Manganese	3.4 ug/L	3.2 ug/L	6
	Mercury	0.03 ug/L	0.03 ug/L	0
	Potassium	648 ug/L	1920 ug/L	99
	Sodium	3040 ug/L	3020 ug/L	0.7
	Zinc	3.6 ug/L	6.0 ug/L	50

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF034	Client ID Laboratory ID Collection Date	30G00301 MC153005 10/16/96	30G00301D MC153008 10/16/96	
	Barium	28.0 ug/L	27.8 ug/L	0.7
	Beryllium	0.20 ug/L	0.13U ug/L	Not calculable
	Calcium	1530 ug/L	1480 ug/L	3
	Copper	11.0 ug/L	3.2 ug/L	110
	Iron	626 ug/L	634 ug/L	1
	Lead	3.8 ug/L	2.4 ug/L	45
	Magnesium	642 ug/L	650 ug/L	1
	Manganese	20.7 ug/L	21.0 ug/L	1
	Mercury	0.04 ug/L	0.05 ug/L	22
	Potassium	1880 ug/L	2680 ug/L	35
	Sodium	4600 ug/L	4490 ug/L	2
	Zinc	5.5 ug/L	4.4 ug/L	22
WF035	Client ID Laboratory ID Collection Date	66G01701 MC214005 10/23/96	66G01701D MC214007 10/23/96	
	Aluminum	24.3 ug/L	30.9 ug/L	24
	Barium	10.2 ug/L	10.7 ug/L	5
	Calcium	766 ug/L	816 ug/L	6
	Copper	1.7U ug/L	22.5 ug/L	Not calculable
	Iron	343 ug/L	348 ug/L	1
	Lead	2.0U ug/L	2.6 ug/L	Not calculable
	Magnesium	320 ug/L	324 ug/L	1
	Manganese	4.2 ug/L	5.4 ug/L	25
	Mercury	0.03 ug/L	0.03 ug/L	0
	Selenium	4.0 ug/L	3.9U ug/L	Not calculable
	Sodium	7660 ug/L	7790 ug/L	2
	Zinc	2.5 ug/L	26.3 ug/L	165
WF036	Client ID Laboratory ID Collection Date	54G00101 MC262004 10/30/96	54G00101D MC262008 10/30/96	
	Aluminum	87.6 ug/L	91.6 ug/L	4
	Barium	75.2 ug/L	74.3 ug/L	1
	Beryllium	0.18 ug/L	0.18 ug/L	0
	Calcium	1680 ug/L	1660 ug/L	1
	Chromium	1.2 ug/L	1.0 ug/L	2
	Cobalt	0.90 ug/L	1.4 ug/L	43
	Magnesium	1950 ug/L	1920 ug/L	2
	Manganese	13.9 ug/L	12.9 ug/L	7
	Mercury	0.02 ug/L	0.01U ug/L	Not calculable
	Potassium	2410 ug/L	2530 ug/L	5
	Sodium	2110 ug/L	2070 ug/L	2
	Zinc	4.5 ug/L	3.5 ug/L	25

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF041	Client ID Laboratory ID Collection Date	35G00101 MD908004 6/11/97	35G00101D MD908005 6/11/97	
	Aluminum	47.8 ug/L	45.2 ug/L	6
	Barium	78.8 ug/L	79.0 ug/L	0.2
	Calcium	3150 ug/L	3240 ug/L	3
	Copper	8.2 ug/L	6.8 ug/L	19
	Iron	15.9 ug/L	19.0 ug/L	16
	Lead	1.7 ug/L	0.93U ug/L	Not calculable
	Magnesium	2340 ug/L	2370 ug/L	1
	Manganese	28.7 ug/L	28.9 ug/L	0.7
	Sodium	4330 ug/L	4430 ug/L	2
	Thallium	1.9 ug/L	0.89U ug/L	Not calculable
	Zinc	12.1 ug/L	130 ug/L	166
	Cyanide	ND	ND	-
WF041	Client ID Laboratory ID Collection Date	35G00202 MD950002 6/15/97	35G00202D MD950003 6/15/97	
	Aluminum	65.0 ug/L	50.7 ug/L	25
	Barium	24.8 ug/L	25.3 ug/L	2
	Calcium	973 ug/L	1030 ug/L	6
	Copper	5.6 ug/L	3.5 ug/L	46
	Iron	180 ug/L	196 ug/L	8
	Lead	0.93U ug/L	1.9 ug/L	Not calculable
	Magnesium	813 ug/L	819 ug/L	0.7
	Manganese	9.5 ug/L	9.3 ug/L	2
	Selenium	1.8U ug/L	2.6 ug/L	Not calculable
	Sodium	20900 ug/L	21700 ug/L	4
	Thallium	1.0 ug/L	0.89U ug/L	Not calculable
	Zinc	18.7 ug/L	15.4 ug/L	19
	Cyanide	ND	ND	-
WF045	Client ID Laboratory ID Collection Date	OWG00502 ME149004 7/8/97	OWG00502D ME149005 7/8/97	
	Aluminum	175 ug/L	160 ug/L	9
	Barium	7.3 ug/L	7.1 ug/L	3
	Calcium	648 ug/L	585 ug/L	10
	Copper	2.9 ug/L	4.4 ug/L	41
	Iron	106 ug/L	97.1 ug/L	9
	Magnesium	308 ug/L	317 ug/L	3
	Manganese	3.3 ug/L	3.5 ug/L	6
	Nickel	7.8 ug/L	7.7U ug/L	Not calculable
	Sodium	1990 ug/L	2060 ug/L	3
	Zinc	4.5 ug/L	4.7 ug/L	4
	Cyanide	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF045	Client ID Laboratory ID Collection Date	OWG00302 ME190002 7/10/97	OWG00302D ME190003 7/10/97	
	Aluminum	31.5 ug/L	16.6 ug/L	Not calculable
	Barium	10.2 ug/L	10.5 ug/L	3
	Calcium	460 ug/L	454 ug/L	1
	Iron	83.3 ug/L	51.1 ug/L	46
	Lead	1.9 ug/L	1.2 ug/L	Not calculable
	Magnesium	286 ug/L	300 ug/L	5
	Manganese	3.0 ug/L	3.0 ug/L	0
	Sodium	1670 ug/L	1670 ug/L	0
	Zinc	3.4 ug/L	3.8 ug/L	11
	Cyanide	ND	ND	-
WF046	Client ID Laboratory ID Collection Date	31G00101 ME241003 7/15/97	31G00101D ME241004 7/15/97	
	Aluminum	96.0 ug/L	91.1 ug/L	5
	Barium	22.6 ug/L	22.5 ug/L	0.4
	Calcium	857 ug/L	851 ug/L	0.7
	Copper	1.3U ug/L	1.4 ug/L	Not calculable
	Iron	120 ug/L	103 ug/L	15
	Magnesium	662 ug/L	675 ug/L	2
	Manganese	9.7 ug/L	9.9 ug/L	2
	Potassium	1910 ug/L	2200 ug/L	15
	Sodium	1760 ug/L	1890 ug/L	7
	Vanadium	1.8 ug/L	1.7U ug/L	Not calculable
	Zinc	3.5 ug/L	9.8 ug/L	95
	Cyanide	ND	ND	-
WF047	Client ID Laboratory ID Collection Date	39W034 ME243005 7/15/97	39W034D ME243006 7/15/97	
	Aluminum	94.0 ug/L	76.3 ug/L	21
	Barium	22.9 ug/L	22.8 ug/L	0.4
	Calcium	1030 ug/L	1010 ug/L	2
	Copper	8.2 ug/L	1.3U ug/L	Not calculable
	Iron	747 ug/L	751 ug/L	0.5
	Magnesium	871 ug/L	854 ug/L	2
	Manganese	12.5 ug/L	12.6 ug/L	0.8
	Sodium	2210 ug/L	2090 ug/L	6
	Zinc	14.7 ug/L	3.0 ug/L	132
WF051	Client ID Laboratory ID Collection Date	16G00101 ME340009 7/24/97	16G00101D ME340010 7/24/97	
	Barium	20.5 ug/L	20.7 ug/L	1
	Calcium	514 ug/L	520 ug/L	1
	Copper	1.7 ug/L	1.7 ug/L	0
	Iron	11.2 ug/L	14.7 ug/L	27
	Magnesium	617 ug/L	623 ug/L	1
	Manganese	3.2 ug/L	3.0 ug/L	6
	Sodium	2130 ug/L	2110 ug/L	1
	Zinc	3.2 ug/L	8.2 ug/L	88

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF053	Client ID Laboratory ID Collection Date	15G00602 ME367004 7/27/97	15G00602D ME367005 7/27/97	
	Aluminum	16.6 ug/L	29.9 ug/L	Not calculable
	Barium	13.0 ug/L	13.0 ug/L	0
	Calcium	676 ug/L	675 ug/L	0.1
	Chromium	3.3 ug/L	4.2 ug/L	24
	Iron	33.8 ug/L	92.6 ug/L	93
	Magnesium	504 ug/L	490 ug/L	3
	Manganese	2.3 ug/L	2.7 ug/L	16
	Sodium	2870 ug/L	2740 ug/L	5
	Zinc	3.1 ug/L	3.4 ug/L	9
WF053	Client ID Laboratory ID Collection Date	15G00703 ME404003 7/30/97	15G00703D ME404004 7/30/97	
	Aluminum	43.6 ug/L	108 ug/L	14
	Antimony	17.3 ug/L	21.2 ug/L	Not calculable
	Barium	6.6 ug/L	6.2 ug/L	6
	Calcium	587 ug/L	549 ug/L	7
	Chromium	10.6 ug/L	13.4 ug/L	23
	Copper	2.9 ug/L	4.5 ug/L	43
	Iron	107 ug/L	115 ug/L	7
	Lead	0.93 ug/L	5.1 ug/L	Not calculable
	Magnesium	280 ug/L	266 ug/L	5
	Manganese	6.9 ug/L	6.5 ug/L	6
	Nickel	10.9 ug/L	20.3 ug/L	60
	Sodium	2040 ug/L	1820 ug/L	11
	Zinc	5.2 ug/L	6.1 ug/L	16
WF054	Client ID Laboratory ID Collection Date	15G00801 ME441002 8/4/97	15G00801D ME441003 8/4/97	
	Aluminum	143 ug/L	116 ug/L	21
	Arsenic	2.0 ug/L	1.1 ug/L	Not calculable
	Barium	34.7 ug/L	37.3 ug/L	7
	Calcium	1870 ug/L	2010 ug/L	7
	Copper	5.2 ug/L	2.6 ug/L	67
	Iron	4760 ug/L	4940 ug/L	4
	Magnesium	1370 ug/L	1470 ug/L	7
	Manganese	84.6 ug/L	91.4 ug/L	8
	Mercury -	0.04 ug/L	0.07 ug/L	Not calculable
	Sodium	1830 ug/L	1960 ug/L	7
	Thallium	0.89 ug/L	0.90 ug/L	Not calculable
	Zinc	8.5 ug/L	6.6 ug/L	25

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes					
SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF022	All	Metals Cyanide	-	-	None None
WF023	All	Metals Cyanide	-	-	None None
WF024	All	Metals Cyanide	-	-	None None
WF025	All	Metals Cyanide	-	-	None None
WF026	All	Metals Cyanide	-	-	None None
WF027	All	Metals Cyanide	-	-	None None
WF028	All	Metals Cyanide	-	-	None None
WF029	All	Metals Cyanide	-	-	None None
WF030	All	Metals Cyanide	-	-	None None
WF031	All	Metals Cyanide	-	-	None None
WF031B	All	Metals Cyanide	-	-	None None
WF032	All	Metals Cyanide	-	-	None None
WF033	All	Metals Cyanide	-	-	None None
WF034	All	Metals Cyanide	-	-	None None
WF035	All	Metals Cyanide	-	-	None None
WF036	All	Metals Cyanide	-	-	None None
WF037	All	Metals Cyanide	-	-	None None
WF041	All	Metals Cyanide	-	-	None None
WF045	All	Metals Cyanide	-	-	None None
WF046	All	Metals Cyanide	-	-	None None
WF047	All	Metals	-	-	None
WF051	All	Metals	-	-	None

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes					
SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF053	All	Metals	-	-	None
WF054	All	Metals	-	-	None

Notes: r = correlation coefficient for initial calibrations
%R = percent recovery for continuing calibrations
J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").
UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.
R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF022	Aluminum Iron Lead Sodium Zinc	6.240 ug/L 12.320 ug/L 0.500 ug/L 38.890 ug/L 3.660 ug/L	All samples in SDG WF022
WF023	Arsenic Iron Lead Sodium Zinc	-0.500 ug/L 5.980 ug/L 1.200 ug/L 34.400 ug/L 1.200 ug/L	All samples in SDG WF023
WF024	Aluminum Iron Lead Sodium	10.600 ug/L 13.190 ug/L 0.500 ug/L 37.550 ug/L	All samples in SDG WF024
WF025	Aluminum Beryllium Iron Selenium Zinc	13.650 ug/L -0.320 ug/L 7.390 ug/L 0.650 ug/L 1.610 ug/L	All samples in SDG WF025
WF026	Aluminum Calcium Iron Magnesium Mercury Sodium Zinc Mercury	17.380 ug/L 119.520 ug/L 10.050 ug/L 22.940 ug/L 0.140 ug/L 41.280 ug/L 2.510 ug/L 0.20 ug/L	All samples in SDG WF026 All samples in SDG WF026
WF027	Aluminum Antimony Arsenic Calcium Sodium Vanadium Mercury	18.000 ug/L 9.280 ug/L 0.500 ug/L 94.550 ug/L 28.990 ug/L 1.280 ug/L 0.21 ug/L	All samples in SDG WF027 All samples in SDG WF027
WF028	Aluminum Antimony Calcium Magnesium Mercury Potassium Sodium Zinc	51.600 ug/L -10.930 ug/L 113.470 ug/L 45.540 ug/L 0.140 ug/L 498.120 ug/L 43.870 ug/L 1.230 ug/L	All samples in SDG WF028

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF029	Aluminum	10.6 ug/L	All samples in SDG WF029
	Barium	3.0 ug/L	
	Cobalt	2.7 ug/L	
	Iron	21.4 ug/L	
	Vanadium	1.4 ug/L	
	Cobalt	2.7 ug/L	All samples in SDG WF029
	Vanadium	1.6 ug/L	
	Mercury	-0.1 ug/L	All samples in SDG WF029
	Iron	5.3 ug/L	All samples in SDG WF029
	Vanadium	1.6 ug/L	
WF030	Calcium	153.810 ug/L	All samples in SDG WF029
	Cobalt	2.390 ug/L	
	Iron	11.590 ug/L	
	Sodium	37.260 ug/L	
	Zinc	1.630 ug/L	
WF030	Calcium	59.580 ug/L	All samples in SDG WF030
	Iron	6.080 ug/L	
WF031	Sodium	54.620 ug/L	
	Mercury	0.030 ug/L	All samples in SDG WF031
	Potassium	-617.8 ug/L	
	Silver	-1.2 ug/L	
	Thallium	3.3 ug/L	
	Mercury	0.047 ug/L	All samples in SDG WF031
	Potassium	34.4 ug/L	
	Silver	-1.6 ug/L	
	Thallium	3.7 ug/L	
	Mercury	0.055 ug/L	All samples in SDG WF031
WF031	Potassium	542.9 ug/L	
	Silver	-1.4 ug/L	
	Thallium		
	Mercury	0.070 ug/L	All samples in SDG WF031
	Potassium	-21.4 ug/L	
WF031	Silver	-1.3 ug/L	
	Thallium	3.5 ug/L	
	Mercury	0.047 ug/L	All samples in SDG WF031
	Potassium	-411.210 ug/L	
	Silver		
WF031	Thallium		
	Mercury	0.085 ug/L	All samples in SDG WF031
	Potassium	955.8 ug/L	
	Silver	-2.5 ug/L	
WF031	Thallium	3.2 ug/L	
	Mercury	0.127 ug/L	All samples in SDG WF031
	Mercury	0.130 ug/L	All samples in SDG WF031
WF031	Mercury	-0.030 ug/L	All samples in SDG WF031
	Potassium	-335.53 ug/L	
	Silver	-1.420 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF031 cont.	Arsenic	-6.4 ug/L	All samples in SDG WF031
	Chromium	-0.4 ug/L	
	Mercury	0.034 ug/L	
	Potassium	171.0 ug/L	
	Thallium	5.1 ug/L	
	Vanadium	1.4 ug/L	
	Mercury	0.016 ug/L	All samples in SDG WF031
	Potassium	342.4 ug/L	
	Silver	-1.2 ug/L	
	Thallium	5.2 ug/L	
	Vanadium	0.8 ug/L	
WF031B	Chromium	-0.7 ug/L	All samples in SDG WF031
	Mercury	0.011 ug/L	
	Potassium	308.7 ug/L	
	Thallium	6.2 ug/L	
	Vanadium	0.7 ug/L	
WF031B	Barium	-0.2 ug/L	All samples in SDG WF031
	Chromium	-0.6 ug/L	
	Mercury	-0.021 ug/L	
	Potassium	377.6 ug/L	
	Thallium	7.2 ug/L	
	Mercury	0.014 ug/L	All samples in SDG WF031
	Arsenic	-6.7 ug/L	All samples in SDG WF031
	Barium	-0.2 ug/L	
	Chromium	-0.8 ug/L	
	Mercury	-0.032 ug/L	
WF031B	Nickel	-1.4 ug/L	
	Potassium	441.5 ug/L	
	Thallium	5.7 ug/L	
	Vanadium	0.6 ug/L	
	Copper	604 ug/L	All samples in SDG WF031B
	Aluminum	-19.5 ug/L	All samples in SDG WF031B
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Manganese	0.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF031B
WF031B	Copper	6.6 ug/L	
	Iron	3.5 ug/L	
	Mercury	0.0 ug/L	
	Nickel	9.5 ug/L	
	Sodium	10.6 ug/L	
	Barium	25.130 ug/L	All samples in SDG WF031B
	Beryllium	-0.830 ug/L	
	Calcium	129.890 ug/L	
	Copper	8.310 ug/L	
	Iron	8.680 ug/L	
WF031B	Magnesium	25.430 ug/L	
	Manganese	0.490 ug/L	
	Silver	2.970 ug/L	
	Sodium	84.450 ug/L	
	Vanadium	2.060 ug/L	
	Zinc	3.100 ug/L	
	Cyanide	-0.981 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF032	Copper	4.5 ug/L	All samples in SDG WF032
	Manganese	0.5 ug/L	
	Mercury	0.0242 ug/L	
	Potassium	-1595.8 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Cobalt	0.3 ug/L	
	Copper	5.5 ug/L	
	Manganese	0.7 ug/L	
	Mercury	0.0265 ug/L	
	Sodium	17.3 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Copper	4.9 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.0255 ug/L	
	Potassium	1914.8 ug/L	
	Sodium	11.6 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Copper	5.6 ug/L	
	Manganese	0.6 ug/L	
	Mercury	-0.0178 ug/L	
	Sodium	17.4 ug/L	
	Barium	1.210 ug/L	All samples in SDG WF032
	Chromium	2.750 ug/L	
	Copper	3.390 ug/L	
	Manganese	0.410 ug/L	
	Mercury	0.015 ug/L	
	Sodium	856.490 ug/L	
	Zinc	2.310 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Cobalt	0.4 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.2 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.4 ug/L	
	Mercury	-0.0874 ug/L	
	Nickel	2.0 ug/L	
	Sodium	11.5 ug/L	
	Barium	0.2 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Thallium	2.6 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.3 ug/L	
	Cobalt	0.6 ug/L	
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Nickel	1.4 ug/L	
	Thallium	4.3 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF032 cont.	Aluminum	107.660 ug/L	All samples in SDG WF032
	Antimony	4.320 ug/L	
	Barium	1.760 ug/L	
	Cadmium	1.660 ug/L	
	Calcium	105.840 ug/L	
	Cobalt	0.430 ug/L	
	Copper	12.450 ug/L	
	Iron	54.350 ug/L	
	Magnesium	103.090 ug/L	
	Manganese	0.280 ug/L	
	Sodium	154.770 ug/L	
	Zinc	9.120 ug/L	
	Antimony	4.3 ug/L	All samples in SDG WF032
	Barium	0.4 ug/L	
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Sodium	10.2 ug/L	All samples in SDG WF032
WF033	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Cobalt	0.4 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.2 ug/L	
	Mercury	0.07 ug/L	
	Potassium	1595.8 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.4 ug/L	
	Mercury	0.04 ug/L	
	Potassium	655.4 ug/L	
	Barium	0.2 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.05 ug/L	
	Potassium	1914.8 ug/L	
	Thallium	2.6 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Cobalt	0.6 ug/L	
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Potassium	425.8 ug/L	
	Thallium	4.3 ug/L	
	Aluminum	164.460 ug/L	All samples in SDG WF033
	Barium	1.220 ug/L	
	Calcium	107.040 ug/L	
	Copper	2.900 ug/L	
	Iron	33.430 ug/L	
	Magnesium	82.790 ug/L	
	Manganese	0.330 ug/L	
	Potassium	1602.780 ug/L	
	Sodium	221.450 ug/L	
	Zinc	1.660 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Mercury	0.06 ug/L	All samples in SDG WF033
	Barium	0.4 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.05 ug/L	
	Potassium	163.8 ug/L	
	Antimony	4.810 ug/L	All samples in SDG WF033
	Barium	0.460 ug/L	
	Copper	2.870 ug/L	
	Manganese	0.330 ug/L	
	Potassium	509.990 ug/L	
	Sodium	137.200 ug/L	
	Zinc	3.200 ug/L	
	Barium	0.8 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.0 ug/L	
	Potassium	1734.0 ug/L	
	Thallium	2.4 ug/L	
	Vanadium	1.1 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.9 ug/L	
	Chromium	1.2 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.3 ug/L	
	Potassium	1605.5 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.8 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Potassium	768.8 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF033
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Potassium	314.6 ug/L	
	Vanadium	1.2 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Barium	1.0 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	684.9 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF033
WF034	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	722.1 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
	Copper	5.8 ug/L	All samples in SDG WF034
	Mercury	0.023 ug/L	
WF034	Copper	5.8 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Mercury	0.017 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.030 ug/L	
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
WF034	Mercury	0.042 ug/L	
	Sodium	10.2 ug/L	
	Barium	0.460 ug/L	66G02001
	Copper	2.870 ug/L	66G00302
	Sodium	137.200 ug/L	66G01801
	Zinc	3.200 ug/L	30G00301
	Cyanide	1.327 ug/L	30G00401 66R02201 30G00301D
	Mercury	0.024 ug/L	All samples in SDG WF034
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	5.2 ug/L	
WF034	Manganese	0.6 ug/L	
	Mercury	0.026 ug/L	
WF034	Mercury	0.040 ug/L	All samples in SDG WF034
	Mercury	0.033 ug/L	All samples in SDG WF034

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF034 cont.	Arsenic	-13.610 ug/L	
	Barium	1.700 ug/L	66G01101
	Beryllium	-0.710 ug/L	66G01301
	Calcium	108.610 ug/L	66G00501
	Copper	1.700 ug/L	66G00501F
	Lead	-8.620 ug/L	
	Manganese	0.790 ug/L	
	Selenium	10.810 ug/L	
	Sodium	70.400 ug/L	
	Zinc	3.200 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Silver	3.3 ug/L	
	Sodium	11.9 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Silver	2.2 ug/L	
	Sodium	12.2 ug/L	
	Beryllium	0.5 ug/L	All samples in SDG WF034
	Copper	1.9 ug/L	
	Manganese	0.6 ug/L	
	Sodium	20.0 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Silver	2.6 ug/L	
	Sodium	17.3 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Sodium	9.7 ug/L	
WF035	Barium	0.8 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0239 ug/L	
	Thallium	2.4 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF035
	Beryllium	0.8 ug/L	
	Manganese	1.3 ug/L	
	Mercury	0.0256 ug/L	
	Thallium	3.4 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0401 ug/L	
	Thallium	3.2 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF035
	Beryllium	0.7 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.334 ug/L	
	Aluminum	101.120 ug/L	All samples in SDG WF035
	Barium	0.410 ug/L	
	Iron	56.400 ug/L	
	Manganese	0.430 ug/L	
	Sodium	152.450 ug/L	
	Zinc	2.190 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF035 cont.	Barium	1.0 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0250 ug/L	
	Thallium	2.2 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF035
	Beryllium	0.7 ug/L	
	Manganese	1.0 ug/L	
	Thallium	3.4 ug/L	
	Barium	0.570 ug/L	All samples in SDG WF035
WF036	Beryllium	-0.910 ug/L	
	Calcium	109.820 ug/L	
	Copper	5.470 ug/L	
	Manganese	0.720 ug/L	
	Zinc	4.400 ug/L	
	Manganese	0.6 ug/L	All samples in SDG WF035
	Manganese	0.4 ug/L	All samples in SDG WF035
	Barium	0.4 ug/L	All samples in SDG WF035
	Beryllium	-0.2 ug/L	
	Manganese	0.6 ug/L	
	Beryllium	-0.2 ug/L	All samples in SDG WF035
	Manganese	0.4 ug/L	All samples in SDG WF035
	Aluminum	17.7 ug/L	All samples in SDG WF036
	Barium	0.8 ug/L	
	Beryllium	0.6 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0265 ug/L	
	Thallium	2.4 ug/L	
	Vanadium	1.1 ug/L	
	Aluminum	18.4 ug/L	All samples in SDG WF036
	Barium	1.2 ug/L	
	Beryllium	0.8 ug/L	
	Cadmium	0.9 ug/L	
	Chromium	1.2 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.3 ug/L	
	Mercury	0.0251 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.8 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF036 cont.	Aluminum	14.7 ug/L	All samples in SDG WF036
	Barium	1.1 ug/L	
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0165 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF036
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0157 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	63.950 ug/L	All samples in SDG WF036
	Barium	0.730 ug/L	
	Chromium	0.490 ug/L	
	Manganese	0.430 ug/L	
	Mercury	0.014 ug/L	
	Potassium	1817.440 ug/L	
	Cyanide	-1.333 ug/L	
	Barium	1.0 ug/L	All samples in SDG WF036
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	91.5 ug/L	All samples in SDG WF036
	Barium	0.9 ug/L	
	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
WF037	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
	Copper	6.4 ug/L	All samples in SDG WF037
	Aluminum	-19.5 ug/L	All samples in SDG WF037
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF037
	Copper	6.6 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF037 cont.	Barium Beryllium Calcium Copper Iron Magnesium Manganese Silver Sodium Vanadium Zinc Cyanide	25.130 ug/L -0.830 ug/L 129.890 ug/L 18.310 ug/L 8.680 ug/L 25.430 ug/L 0.490 ug/L 2.970 ug/L 84.450 ug/L 2.060 ug/L 3.100 ug/L -0.981 ug/L	All samples in SDG WF037
WF041	Cyanide	-0.6 ug/L	All samples in SDG WF041
	Barium	0.5 ug/L	All samples in SDG WF041
	Sodium Cyanide	12.2 ug/L -0.4 ug/L	All samples in SDG WF041
	Barium Sodium	0.7 ug/L 16.3 ug/L	All samples in SDG WF041
	Beryllium Calcium Copper Iron Lead Sodium Thallium Zinc Cyanide	-1.010 ug/L 133.200 ug/L 3.740 ug/L 9.490 ug/L 1.260 ug/L 93.470 ug/L 1.310 ug/L 19.070 ug/L -1.002 ug/L	All samples in SDG WF041
	Barium Chromium Copper Magnesium Silver Vanadium	-0.6 ug/L -2.9 ug/L -1.7 ug/L -22.9 ug/L -2.8 ug/L -3.0 ug/L	All samples in SDG WF041
	Copper Thallium Vanadium	6.4 ug/L 1.4 ug/L -1.9 ug/L	All samples in SDG WF041
	Cobalt Thallium Cyanide	8.9 ug/L 1.6 ug/L -0.4 ug/L	All samples in SDG WF041
	Beryllium Calcium Iron Selenium Sodium Vanadium Zinc	-0.830 ug/L 105.800 ug/L 3.860 ug/L -3.230 ug/L 15.150 ug/L -2.240 ug/L 0.940 ug/L	All samples in SDG WF041
	Selenium Thallium	-3.4 ug/L -1.3 ug/L	All samples in SDG WF041
	Lead Selenium Cyanide	1.2 ug/L -2.6 ug/L -0.4 ug/L	All samples in SDG WF041

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF041 cont.	Selenium	-3.1 ug/L	All samples in SDG WF041
	Thallium	1.3 ug/L	
	Selenium	-2.8 ug/L	All samples in SDG WF041
	Cyanide	-0.5 ug/L	
	Thallium	-1.0 ug/L	All samples in SDG WF041
	Cyanide	-0.4 ug/L	
WF045	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
WF045	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Manganese	0.4 ug/L	All samples in SDG WF045
	Vanadium	1.8 ug/L	All samples in SDG WF045
	Beryllium	-0.860 ug/L	All samples in SDG WF045
	Calcium	136.80 ug/L	
	Iron	5.390 ug/L	
	Sodium	32.780 ug/L	
	Vanadium	-1.730 ug/L	
	Zinc	3.340 ug/L	
	Cyanide	-1.013 ug/L	
	Mercury	0.1 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Thallium	1.1 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Aluminum	17.320 ug/L	All samples in SDG WF045
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Cyanide	-0.899 ug/L	
	Beryllium	0.2 ug/L	OWG00401
	Manganese	0.5 ug/L	OWG00201
	Sodium	17.2 ug/L	
	Beryllium	0.2 ug/L	OWG00401
	Manganese	0.7 ug/L	OWG00201
	Sodium	12.2 ug/L	
	Zinc	1.0 ug/L	

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF045 cont.	Barium	0.9 ug/L	OWG00401
	Beryllium	0.5 ug/L	OWG00201
	Chromium	3.0 ug/L	
	Manganese	1.0 ug/L	
	Sodium	19.9 ug/L	
	Thallium	1.2 ug/L	
	Vanadium	2.0 ug/L	
	Zinc	1.6 ug/L	
	Cyanide	-0.377 ug/L	OWG00401 OWG00201
	Beryllium	0.2 ug/L	OWG00401
WF046	Sodium	11.0 ug/L	OWG00201
	Selenium	-2.2 ug/L	OWG00401 OWG00201
	Thallium	-1.0 ug/L	OWG00401 OWG00201
	Beryllium	0.2 ug/L	All samples in SDG WF046
	Sodium	17.2 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF046
	Mercury	0.040 ug/L	
	Sodium	12.2 ug/L	
	Beryllium	0.5 ug/L	All samples in SDG WF046
	Mercury	0.043 ug/L	
WF047	Sodium	19.9 ug/L	
	Aluminum	17.320 ug/L	All samples in SDG WF046
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Boron	-0.377 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF046
	Sodium	11.0 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF047
	Manganese	0.5 ug/L	
	Mercury	0.1 ug/L	
	Sodium	17.2 ug/L	
	Zinc	1.0 ug/L	All samples in SDG WF047
	Barium	0.9 ug/L	All samples in SDG WF047
	Beryllium	0.5 ug/L	
	Chromium	3.0 ug/L	
	Manganese	1.0 ug/L	
	Sodium	19.9 ug/L	
	Thallium	1.1 ug/L	
	Vanadium	2.0 ug/L	
	Zinc	1.6 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF047 cont.	Aluminum Barium Beryllium Calcium Iron Sodium Thallium Zinc	17.320 ug/L 0.450 ug/L -0.550 ug/L 121.820 ug/L 6.770 ug/L 45.700 ug/L -1.390 ug/L 2.510 ug/L	All samples in SDG WF047
	Beryllium Sodium Selenium	0.2 ug/L 11.0 ug/L -2.2 ug/L	All samples in SDG WF047
WF051	Barium Beryllium Chromium Copper Manganese Silver Vanadium	1.0 ug/L 0.2 ug/L 3.4 ug/L 1.5 ug/L 0.5 ug/L 2.8 ug/L 2.4 ug/L	All samples in SDG WF051
	Manganese Mercury Vanadium	-0.5 ug/L 0.04 ug/L 1.8 ug/L	All samples in SDG WF051
	Arsenic Mercury Selenium	1.1 ug/L 0.04 ug/L -1.9 ug/L	All samples in SDG WF051
	Manganese Mercury	-0.5 ug/L 0.07 ug/L	All samples in SDG WF051
	Beryllium Calcium Iron Sodium Zinc	-0.800 ug/L 140.860 ug/L 5.470 ug/L 36.740 ug/L 1.980 ug/L	All samples in SDG WF051
	Mercury Silver	0.08 ug/L -2.4 ug/L	All samples in SDG WF051
	Aluminum Barium Beryllium Calcium Chromium Cobalt Copper Iron Manganese Silver Sodium Vanadium Zinc	16.800 ug/L 0.600 ug/L -0.680 ug/L 127.440 ug/L 3.050 ug/L 2.850 ug/L 2.120 ug/L 10.740 ug/L 0.690 ug/L 3.040 ug/L 54.160 ug/L 2.700 ug/L 2.710 ug/L	All samples in SDG WF051
	Calcium	42.0 ug/L	All samples in SDG WF051

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF051 cont.	Barium	0.6 ug/L	All samples in SDG WF051
	Beryllium	0.4 ug/L	
	Cobalt	2.6 ug/L	
	Copper	1.7 ug/L	
	Manganese	0.9 ug/L	
	Zinc	1.2 ug/L	
	Manganese	0.7 ug/L	All samples in SDG WF051
	Arsenic	-1.130 ug/L	All samples in SDG WF051
	Beryllium	-0.720 ug/L	
	Calcium	131.080 ug/L	
	Iron	12.060 ug/L	
	Zinc	4.540 ug/L	
	Lead	-1.3 ug/L	All samples in SDG WF051
	Lead	-1.4 ug/L	All samples in SDG WF051
	Magnesium	0.5 ug/L	
	Lead	-1.6 ug/L	All samples in SDG WF051
	Aluminum	18.640 ug/L	All samples in SDG WF051
	Barium	0.490 ug/L	
	Beryllium	-0.760 ug/L	
	Calcium	134.210 ug/L	
	Chromium	3.850 ug/L	
	Iron	35.410 ug/L	
	Manganese	0.500 ug/L	
	Sodium	35.200 ug/L	
	Zinc	2.300 ug/L	
	Lead	-2.0 ug/L	All samples in SDG WF051
	Vanadium	2.0 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF051
	Beryllium	0.3 ug/L	
	Lead	-2.0 ug/L	
	Manganese	0.7 ug/L	
	Sodium	9.2 ug/L	
	Sodium	15.0 ug/L	All samples in SDG WF051
	Arsenic	-1.6 ug/L	All samples in SDG WF051
WF053	Aluminum	18.640 ug/L	All samples in SDG WF053
	Barium	0.490 ug/L	
	Beryllium	-0.760 ug/L	
	Calcium	134.210 ug/L	
	Chromium	3.850 ug/L	
	Iron	35.410 ug/L	
	Manganese	0.500 ug/L	
	Sodium	35.200 ug/L	
	Zinc	2.330 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Analyte	Concentration	Associated Samples
WF053 cont.	Barium	-0.760 ug/L	All samples in SDG WF053
	Calcium	138.650 ug/L	
	Chromium	3.750 ug/L	
	Copper	3.390 ug/L	
	Iron	14.500 ug/L	
	Manganese	0.490 ug/L	
	Nickel	8.370 ug/L	
	Sodium	42.790 ug/L	
	Zinc	2.940 ug/L	
	Aluminum	26.970 ug/L	All samples in SDG WF053
	Beryllium	-0.710 ug/L	
	Calcium	151.990 ug/L	
	Iron	16.430 ug/L	
	Manganese	0.580 ug/L	
	Silver	4.360 ug/L	
	Sodium	52.750 ug/L	
	Zinc	3.720 ug/L	
	Beryllium	-0.970 ug/L	All samples in SDG WF053
	Calcium	130.780 ug/L	
	Copper	1.480 ug/L	
	Iron	19.510 ug/L	
	Lead	-1.380 ug/L	
	Manganese	0.780 ug/L	
	Sodium	13.170 ug/L	
	Zinc	6.090 ug/L	
	Aluminum	52.990 ug/L	All samples in SDG WF053
	Arsenic	1.300 ug/L	
	Beryllium	-0.940 ug/L	
	Calcium	198.990 ug/L	
	Chromium	6.790 ug/L	
	Copper	2.230 ug/L	
	Iron	38.980 ug/L	
	Lead	-1.460 ug/L	
	Manganese	1.000 ug/L	
	Sodium	60.080 ug/L	
	Zinc	2.040 ug/L	
WF054	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Beryllium	-0.980 ug/L	All samples in SDG WF054
	Calcium	110.890 ug/L	
	Iron	9.300 ug/L	
	Mercury	0.052 ug/L	
	Vanadium	-2.660 ug/L	
	Zinc	2.260 ug/L	

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Parameter	Concentration	Qualifier
WF022	Client ID: BKR01001 Laboratory ID: RB858002 Collection Date: 7/16/96 Type: Equipment rinsate		
	Sodium	43.4 ug/L	None
	Aluminum	55.9 ug/L	23.9U ug/L
	Calcium	69.0 ug/L	None
	Iron	23.9 ug/L	43.4U ug/L
	Magnesium	39.7 ug/L	None
	Mercury	0.10 ug/L	None
	Zinc	1.2 ug/L	1.2U ug/L
WF022	Client ID: BKF01001 Laboratory ID: RB858010 Collection Date: 7/17/96 Type: Source blank		
	Sodium	61.3 ug/L	61.3U ug/L
WF023	Client ID: 01R01101 Laboratory ID: RB887005 Collection Date: 7/23/96 Type: Equipment rinsate		
	Aluminum	13.3 ug/L	None
	Iron	10.8 ug/L	10.8U ug/L
	Zinc	1.2 ug/L	1.2U ug/L
	Cyanide	2.6 ug/L	None
WF024	Client ID: 15R01201 Laboratory ID: RB920005 Collection Date: 7/31/96 Type: Equipment rinsate		
	Aluminum	13.8 ug/L	13.8U ug/L
	Iron	10.5 ug/L	10.5U ug/L
	Sodium	55.4 ug/L	55.4U ug/L
	Cyanide	2.6 ug/L	None
WF025	Client ID: 15R01301 Laboratory ID: RB956011 Collection Date: 8/7/96 Type: Equipment rinsate		
	Iron	5.3 ug/L	5.3U ug/L
	Sodium	26.6 ug/L	None
	Zinc	1.8 ug/L	1.8U ug/L
WF026	Client ID: 15R01401 Laboratory ID: RB980012 Collection Date: 8/14/96 Type: Equipment rinsate		
	Iron	14.8 ug/L	14.8U ug/L
	Zinc	1.1 ug/L	1.1U ug/L
	Cyanide	1.8 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Parameter	Concentration	Qualifier
WF027	Client ID: 16R01501 Laboratory ID: RC016012 Collection Date: 8/21/96 Type: Equipment rinseate	Arsenic 0.50 ug/L Calcium 64.0 ug/L Lead 0.80 ug/L Sodium 26.9 ug/L Zinc 1.8 ug/L	0.50U ug/L 64.0U ug/L None 26.9U ug/L None
WF028	Client ID: 11R01601 Laboratory ID: RC044016 Collection Date: 8/28/96 Type: Equipment rinseate	Calcium 67.2 ug/L Sodium 30.8 ug/L Cyanide 1.5 ug/L	67.2U ug/L 30.8U ug/L None
WF029	Client ID: 13R01701 Laboratory ID: RC092008 Collection Date: 9/11/96 Type: Equipment rinseate	Calcium 66.4 ug/L Sodium 25.4 ug/L Zinc 1.8 ug/L	66.4U ug/L 25.4U ug/L 1.8U ug/L
WF030	Client ID: 66R01801 Laboratory ID: RC121010 Collection Date: 9/18/96 Type: Equipment rinseate	Calcium 55.7 ug/L Iron 9.2 ug/L Selenium 0.68 ug/L Sodium 24.9 ug/L Zinc 2.0 ug/L	55.7U ug/L 9.2U ug/L None 24.9U ug/L None
WF031	Client ID: 05R01901 Laboratory ID: MB928011 Collection Date: 9/25/96 Type: Equipment rinseate	Barium 0.34 ug/L Manganese 0.38 ug/L Mercury 0.06 ug/L Zinc 2.0 ug/L	None None 0.06U ug/L None
WF032	Client ID: 06R02001 Laboratory ID: MC011006 Collection Date: 10/2/96 Type: Equipment rinseate	Barium 2.8 ug/L Chromium 2.5 ug/L Copper 2.9 ug/L Manganese 0.48 ug/L Mercury 0.01 ug/L Sodium 365 ug/L Zinc 3.0 ug/L Cyanide 1.4 ug/L	2.8U ug/L 2.5U ug/L 2.9U ug/L 0.48U ug/L 0.01U ug/L None 3.0U ug/L None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Parameter	Concentration	Qualifier
WF033	Client ID: 66R02101 Laboratory ID: MC085007 Collection Date: 10/9/96 Type: Equipment rinseate		
	Barium	1.6 ug/L	1.6U ug/L
	Beryllium	0.32 ug/L	0.32U ug/L
	Chromium	0.55 ug/L	0.55U ug/L
	Cobalt	0.84 ug/L	0.84U ug/L
	Manganese	2.4 ug/L	2.4U ug/L
	Potassium	777 ug/L	777U ug/L
	Sodium	334 ug/L	334U ug/L
	Vanadium	0.63 ug/L	0.63U ug/L
	Zinc	1.4 ug/L	1.4U ug/L
WF034	Client ID: 66R0201 Laboratory ID: MC153007 Collection Date: 10/16/96 Type: Equipment rinseate		
	Barium	0.56 ug/L	0.56 ug/L
	Manganese	0.44 ug/L	0.44 ug/L
	Mercury	0.02 ug/L	0.02 ug/L
	Sodium	119 ug/L	119 ug/L
	Zinc	2.2 ug/L	2.2 ug/L
WF035	Client ID: 66R02301 Laboratory ID: MC214006 Collection Date: 10/23/96 Type: Equipment rinseate		
	Aluminum	30.7 ug/L	30.7 ug/L
	Barium	1.3 ug/L	1.3 ug/L
	Calcium	101 ug/L	101 ug/L
	Manganese	0.94 ug/L	0.94 ug/L
	Mercury	0.03 ug/L	0.03 ug/L
	Sodium	100 ug/L	100 ug/L
	Zinc	2.4 ug/L	2.4 ug/L
WF036	Client ID: 54R02401 Laboratory ID: MC262007 Collection Date: 10/30/96 Type: Equipment rinseate		
	Aluminum	14.8 ug/L	14.8 ug/L
	Barium	0.59 ug/L	0.59 ug/L
	Chromium	0.48 ug/L	0.48 ug/L
	Manganese	0.32 ug/L	0.32 ug/L
	Potassium	756 ug/L	756 ug/L
	Sodium	265 ug/L	None
	Zinc	1.4 ug/L	None
WF037	Client ID: 15F00201 Laboratory ID: MC424010 Collection Date: 12/2/96 Type: Source blank		
	Barium	1.2 ug/L	None
	Calcium	111 ug/L	None
	Copper	6.8 ug/L	None
	Manganese	0.43 ug/L	None
	Sodium	95.7 ug/L	None
	Zinc	2.6 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Parameter	Concentration	Qualifier
WF041	Client ID: 35F00301 Laboratory ID: MD908002 Collection Date: 6/11/97 Type: Source blank	Barium 0.78 ug/L Calcium 164 ug/L Copper 10.3 ug/L Iron 35.6 ug/L Lead 1.0 ug/L Manganese 0.88 ug/L Sodium 129 ug/L Zinc 13.3 ug/L	None 164U ug/L 10.3U ug/L 35.6U ug/L 1.0U ug/L None 129U ug/L 13.3U ug/L
WF041	Client ID: 35R03001 Laboratory ID: MD908003 Collection Date: 6/11/97 Type: Equipment rinsate	Barium 1.0 ug/L Calcium 165 ug/L Copper 4.9 ug/L Iron 10.7 ug/L Manganese 1.2 ug/L Sodium 148 ug/L Thallium 1.7 ug/L Zinc 15.8 ug/L	None 165U ug/L 4.9U ug/L 10.7U ug/L None 148U ug/L 1.7U ug/L 15.8U ug/L
WF045	Client ID: OWR03401 Laboratory ID: ME149002 Collection Date: 7/7/97 Type: Equipment rinsate	Barium 0.44 ug/L Calcium 133 ug/L Copper 1.8 ug/L Iron 7.1 ug/L Sodium 60.4 ug/L Zinc 1.7 ug/L	0.44U ug/L 133U ug/L None 7.1U ug/L 60.4U ug/L 1.7U ug/L
WF046	Client ID: 31R03301 Laboratory ID: MW241002 Collection Date: 7/15/97 Type: Equipment rinsate	Barium 1.1 ug/L Calcium 126 ug/L Iron 4.4 ug/L Manganese 0.40 ug/L Sodium 65.6 ug/L Zinc 5.4 ug/L	1.1U ug/L 126U ug/L 4.4U ug/L None 65.6U ug/L 5.4U ug/L

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	Parameter	Concentration	Qualifier
WF051	Client ID: 16R03601 Laboratory ID: ME340005 Collection Date: 7/23/97 Type: Equipment rinseate	Calcium 166 ug/L Copper 1.7 ug/L Iron 12.7 ug/L Lead 1.2 ug/L Manganese 0.68 ug/L Sodium 48.9 ug/L Zinc 2.6 ug/L	166U ug/L 1.7U ug/L 12.7U ug/L None 0.68U ug/L 48.9U ug/L 2.6U ug/L
WF053	Client ID: 15R03701 Laboratory ID: ME367002 Collection Date: 7/27/97 Type: Equipment rinseate	Barium 1.6 ug/L Calcium 134 ug/L Chromium 4.2 ug/L Copper 2.1 ug/L Iron 18.4 ug/L Manganese 0.69 ug/L Sodium 83.0 ug/L Zinc 5.0 ug/L	None 134U ug/L 4.2U ug/L 2.1U ug/L None 0.69U ug/L 83.0U ug/L 5.0U ug/L
WF054	Client ID: 15R03801 Laboratory ID: ME441005 Collection Date: 8/5/97 Type: Equipment rinseate	Cadmium 4.7 ug/L Calcium 159 ug/L Copper 1.3 ug/L Iron 13.3 ug/L Manganese 0.48 ug/L Mercury 0.05 ug/L Sodium 20.0 ug/L Zinc 1.8 ug/L	159U ug/L None 13.3U ug/L None 0.05U ug/L None None
WF054	Client ID: 30R03901 Laboratory ID: ME450002 Collection Date: 8/6/97 Type: Equipment rinseate	Aluminum 16.7 ug/L Barium 0.78 ug/L Calcium 150 ug/L Copper 3.7 ug/L Iron 14.0 ug/L Manganese 0.58 ug/L Sodium 67.0 ug/L Zinc 4.4 ug/L	None None 150U ug/L None 14.0U ug/L None None None
¹ = sample result was modified based on an associated method blank concentration.			
Note: see detailed data validation report for the discrete qualifiers.			

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision ¹	Accuracy ²	Representativeness	Completeness (%)	Comparability
WF033	Volatiles Semivolatiles Pesticides/PCBs Metals Cyanide	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 100	Acceptable Acceptable Acceptable Acceptable Acceptable
WF034	Volatiles Semivolatiles Pesticides/PCBs Metals Cyanide	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 100	Acceptable Acceptable Acceptable Acceptable Acceptable
WF035	Volatiles Semivolatiles Pesticides/PCBs Metals Cyanide	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 100	Acceptable Acceptable Acceptable Acceptable Acceptable
WF036	Volatiles Semivolatiles Pesticides/PCBs Metals Cyanide	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 100	Acceptable Acceptable Acceptable Acceptable Acceptable
WF037	Volatiles Semivolatiles Pesticides/PCBs Metals Cyanide	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Unacceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 0	Acceptable Acceptable Acceptable Acceptable Acceptable
WF038	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF039	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF040	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF041	Volatiles Semivolatiles Pesticides & PCBs Metals Cyanide	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 100	Acceptable Acceptable Acceptable Acceptable Acceptable
WF042	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF043	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF044	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF045	Volatiles Semivolatiles Pesticides & PCBs Metals Cyanide	Acceptable Acceptable Unacceptable Acceptable Acceptable	Acceptable Acceptable Unacceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 100	Acceptable Acceptable Acceptable Acceptable Acceptable
WF046	Volatiles Semivolatiles Pesticides & PCBs Metals Cyanide	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	Acceptable Acceptable Acceptable Acceptable Acceptable	100 100 100 100 100	Acceptable Acceptable Acceptable Acceptable Acceptable
WF047	Volatiles Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	97.0 100	Acceptable Acceptable
WF048	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF049	Volatiles Semivolatiles	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	95.2 100	Acceptable Acceptable
WF051	Volatiles Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	100 100	Acceptable Acceptable
WF052	Volatiles	Acceptable	Acceptable	Acceptable	94.3	Acceptable

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision ¹	Accuracy ²	Representativeness	Completeness (%)	Comparability
WF053	Volatile Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	100 100	Acceptable Acceptable
WF054	Volatile Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	100 100	Acceptable Acceptable
WF055	Volatile	Acceptable	Acceptable	Acceptable	100	Acceptable

¹Cumulative of sampling and analytical components

²Analytical component.

³Samples results rejected for database purposes were not used in the completeness calculation.

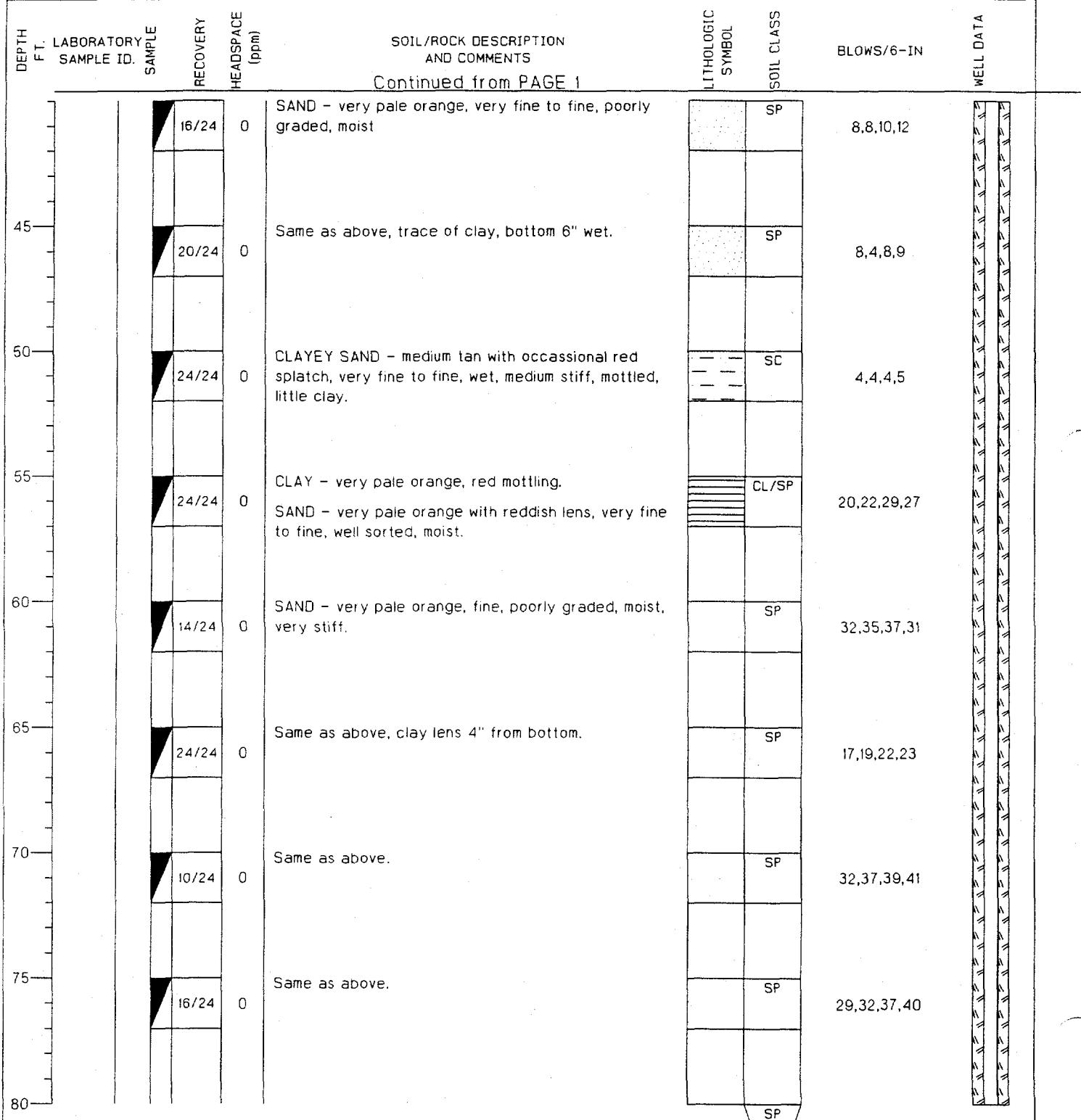
Notes. All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent

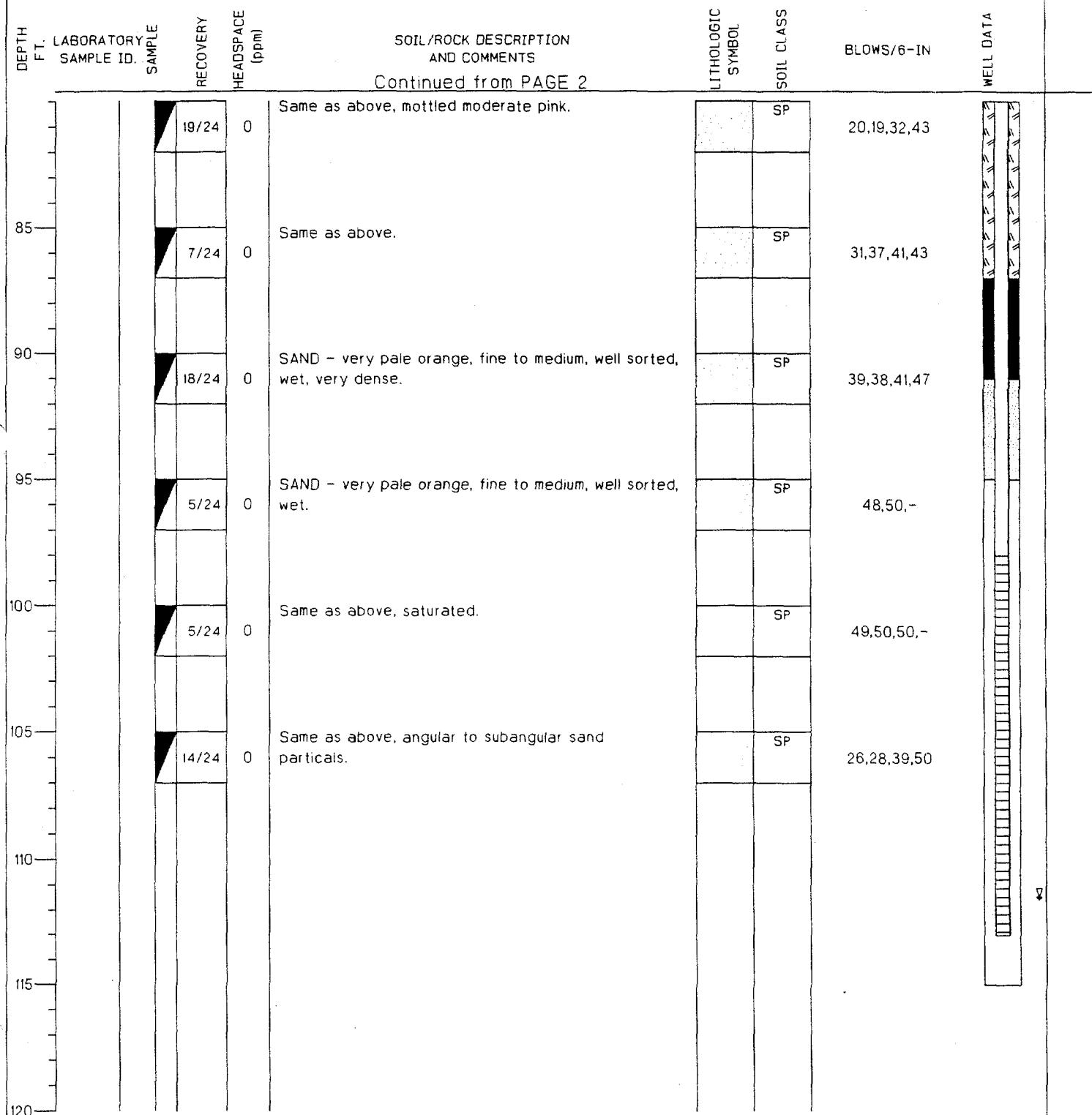
APPENDIX B
MONITORING WELL LOGS

TITLE: NAVAL AIR STATION WHITING FIELD			LOG of WELL: WHF-17-1S		BORING NO.		
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA				
CONTRACTOR: Groundwater Protection Inc.			DATE STARTED: 7/16/93		COMPLTD: 7/27/93		
METHOD: MUD ROTARY	CASE SIZE: 6"/2"		SCREEN INT.: 78-113 FT	PROTECTION LEVEL: D			
TOC ELEV.: 195.49 FEET.	MONITOR INST.: OVA		TOT DPTH: 115 FEET.	DPTH TO 111.45 FEET.			
LOGGED BY: N. Roka/G. Walker	WELL DEVELOPMENT DATE:			SITE: 17 - Fire Training			
DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5	24/24	0.2	GRAVELLY SILT - red, firm to soft, moist.	○ ○ ○ ○	GM	4,9,5,6	
10	16/24	0.3	SAND - red, fine, poorly graded, medium dense, moist.	SP		4,6,5,6	
15	14/24	BKG	SAND - light tan, fine to medium, poorly graded, medium dense, slightly moist, subrounded.	SP		7,10,11,16	
20	12/24	BKG	SAND - red, fine to medium, poorly graded, moderately dense to dense, subangular to angular.	SP		11,19,21,27	
25	16/24	0.2	SAND - whitish green to pink, very fine to fine, poorly graded, dense, dry.	SP		14,19,27,33	
30	12/24	0.1	SAND - pinkish tan, very fine to medium, poorly graded, dense, moist.	SP		11,23,24,26	
35	24/24	BKG	CLAY - gray to purple, vat, very plastic, soft.	CHL		3,4,5,9	
	21/24	0.3	CLAYEY SAND - purple, loose, soft, moist.	SP		9,10,10,12	
			SAND - very fine to fine, poorly graded, medium dense, damp.	SP			
40							

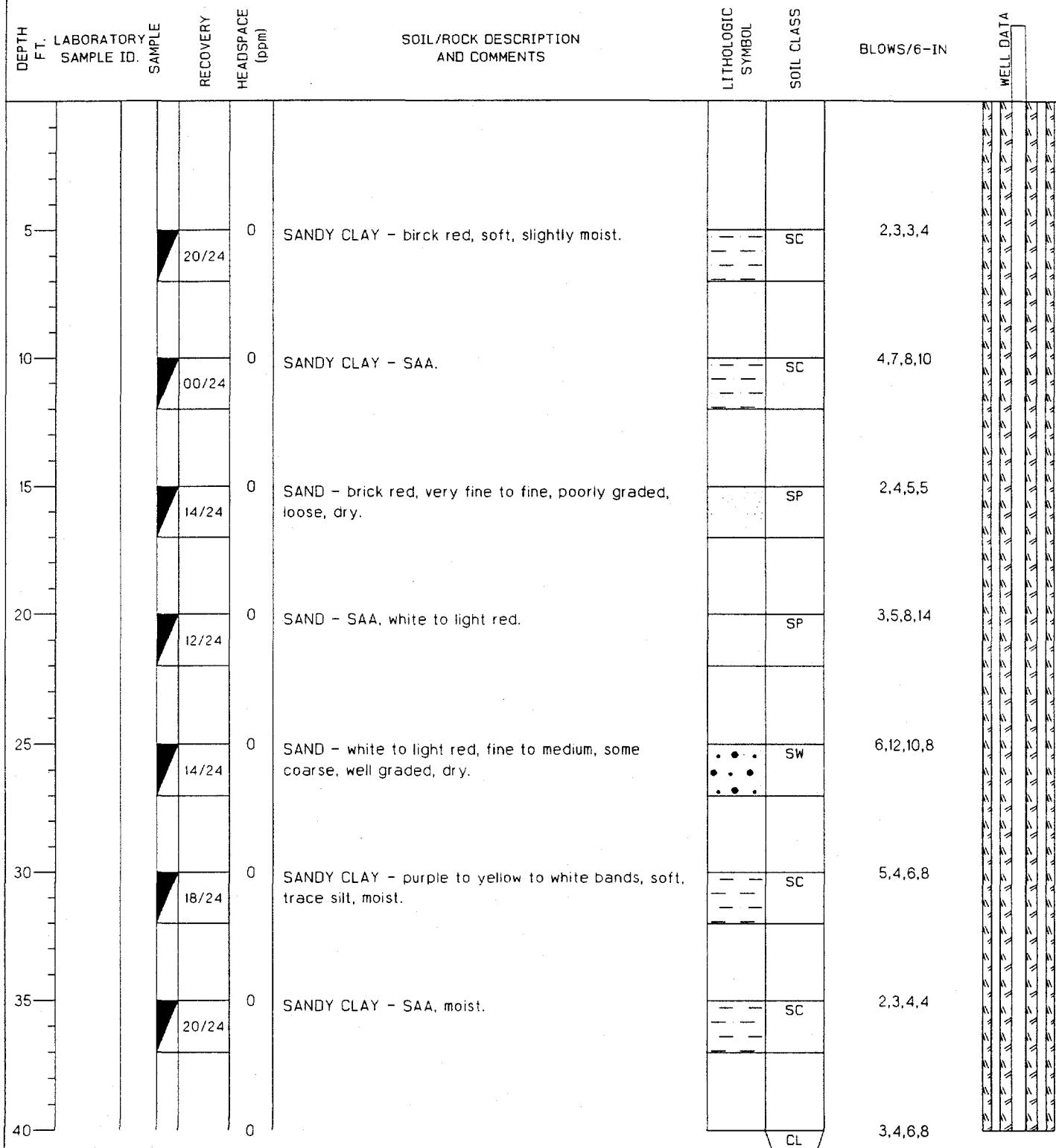
TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-17-1S	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/16/93	COMPLTD: 7/27/93
METHOD: MUD ROTARY	CASE SIZE: 6"/2"	SCREEN INT.: 78-113 FT	PROTECTION LEVEL: D
TOC ELEV.: 195.49 FEET.	MONITOR INST.: OVA	TOT DPTH: 115 FEET.	DPTH TO 111.45 FEET.
LOGGED BY: N. Roka/G. Walker	WELL DEVELOPMENT DATE:		SITE: 17 - Fire Training



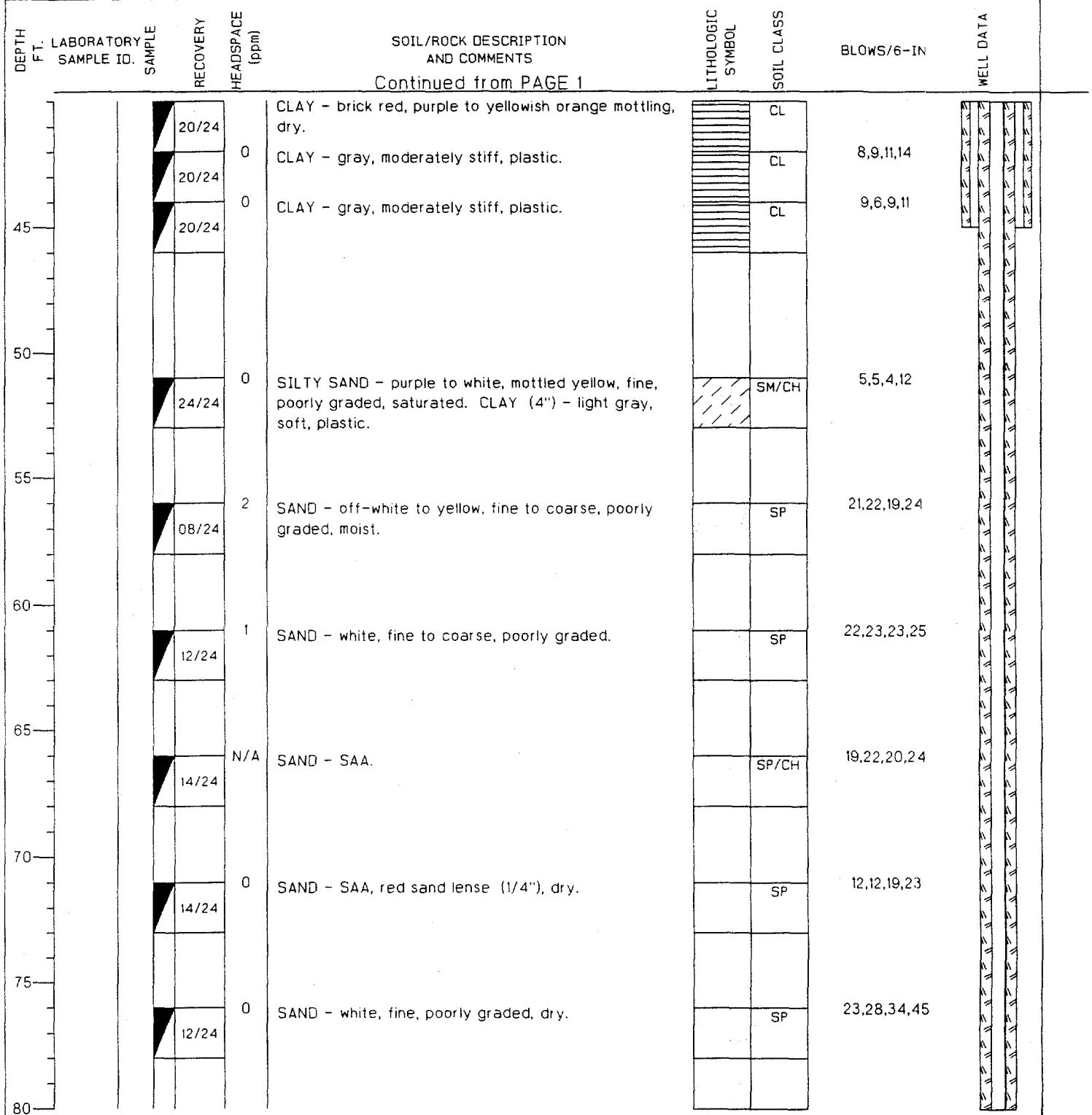
TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-17-1S	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/16/93	COMPLTD: 7/27/93
METHOD: MUD ROTARY	CASE SIZE: 6"/2"	SCREEN INT.: 78-113 FT	PROTECTION LEVEL: D
TOC ELEV.: 195.49 FEET.	MONITOR INST.: OVA	TOT DPTH: 115 FEET.	DPTH TO ♦ 111.45 FEET.
LOGGED BY: N. Roka/G. Walker	WELL DEVELOPMENT DATE:		SITE: 17 - Fire Training



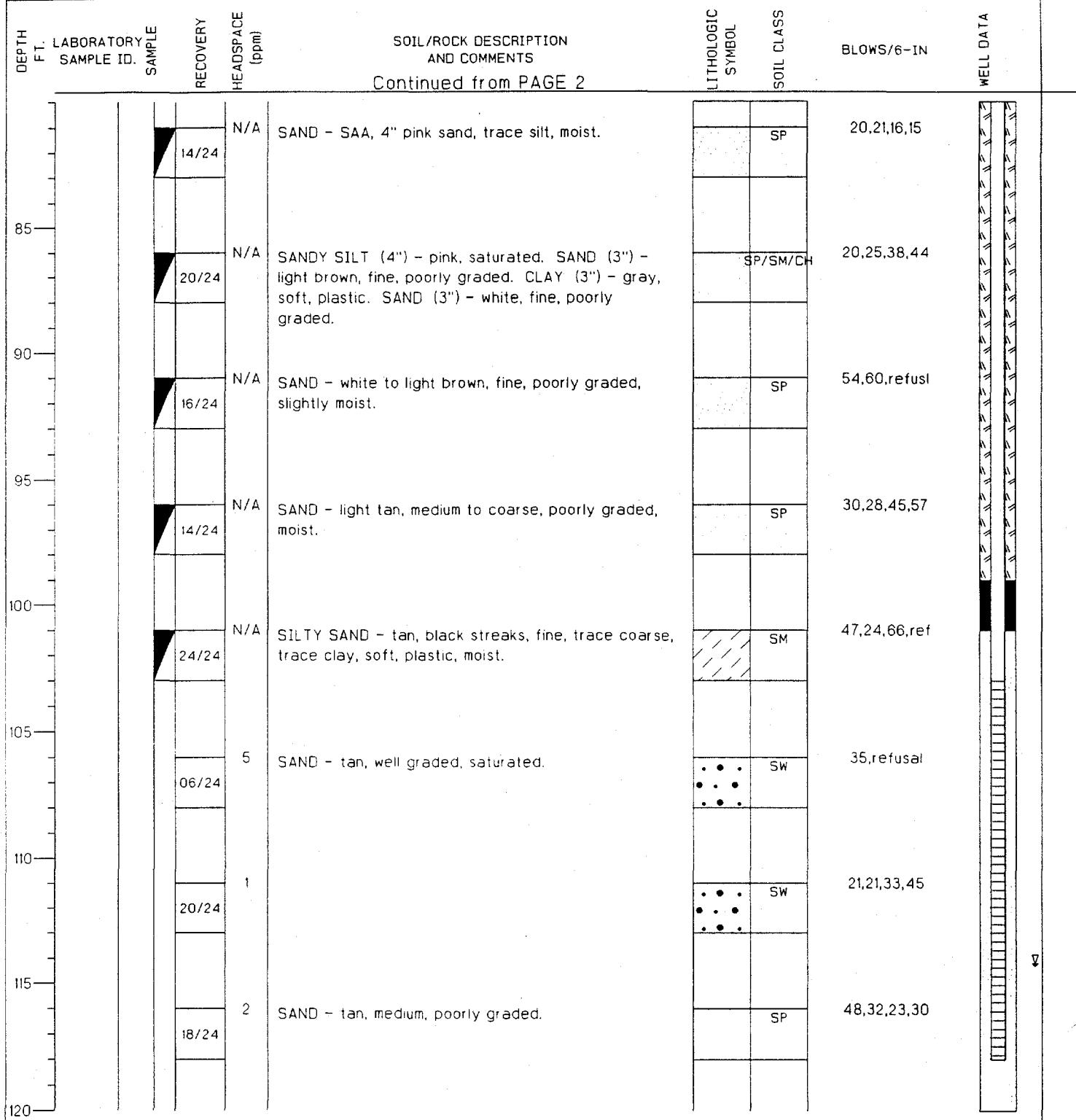
TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-17-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 2/23/93	COMPLTD: 3/07/93
METHOD: HSA	CASE SIZE: 2 in.	SCREEN INT.: 104-119 FT	PROTECTION LEVEL: D
TOC ELEV.: 197.47 FEET.	MONITOR INST.: OVA	TOT DPTH: 120 FEET.	DEPTH TO ∇ 114.21 FEET.
LOGGED BY: G. Kanchibhatla, R. Nelson	WELL DEVELOPMENT DATE:		SITE: 17 - Fire Training



TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-17-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 2/23/93	COMPLTD: 3/07/93
METHOD: HSA	CASE SIZE: 2 in.	SCREEN INT.: 104-119 FT	PROTECTION LEVEL: D
TOC ELEV.: 197.47 FEET.	MONITOR INST.: OVA	TOT DPTH: 120 FEET.	DPTH TO 114.21 FEET.
LOGGED BY: G. Kanchibhatla, R. Nelson	WELL DEVELOPMENT DATE:	SITE: 17 - Fire Training	

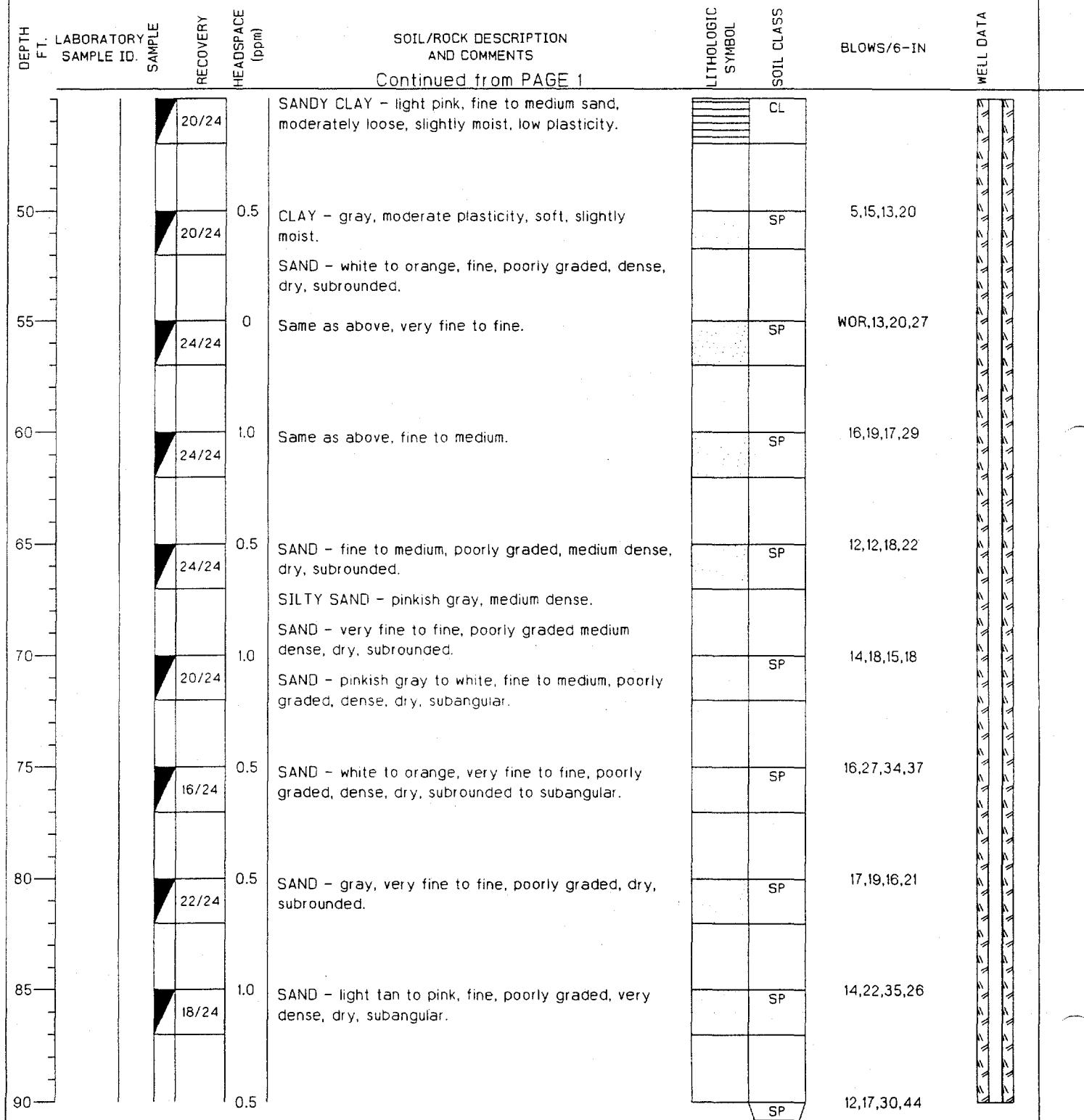


TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-17-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 2/23/93	COMPLTD: 3/07/93
METHOD: HSA	CASE SIZE: 2 in.	SCREEN INT.: 104-119 FT	PROTECTION LEVEL: D
TOC ELEV.: 197.47 FEET.	MONITOR INST.: OVA	TOT DPTH: 120 FEET.	DPTH TO 114.21 FEET.
LOGGED BY: G. Kanchibhatla, R. Nelson	WELL DEVELOPMENT DATE:		SITE: 17 - Fire Training

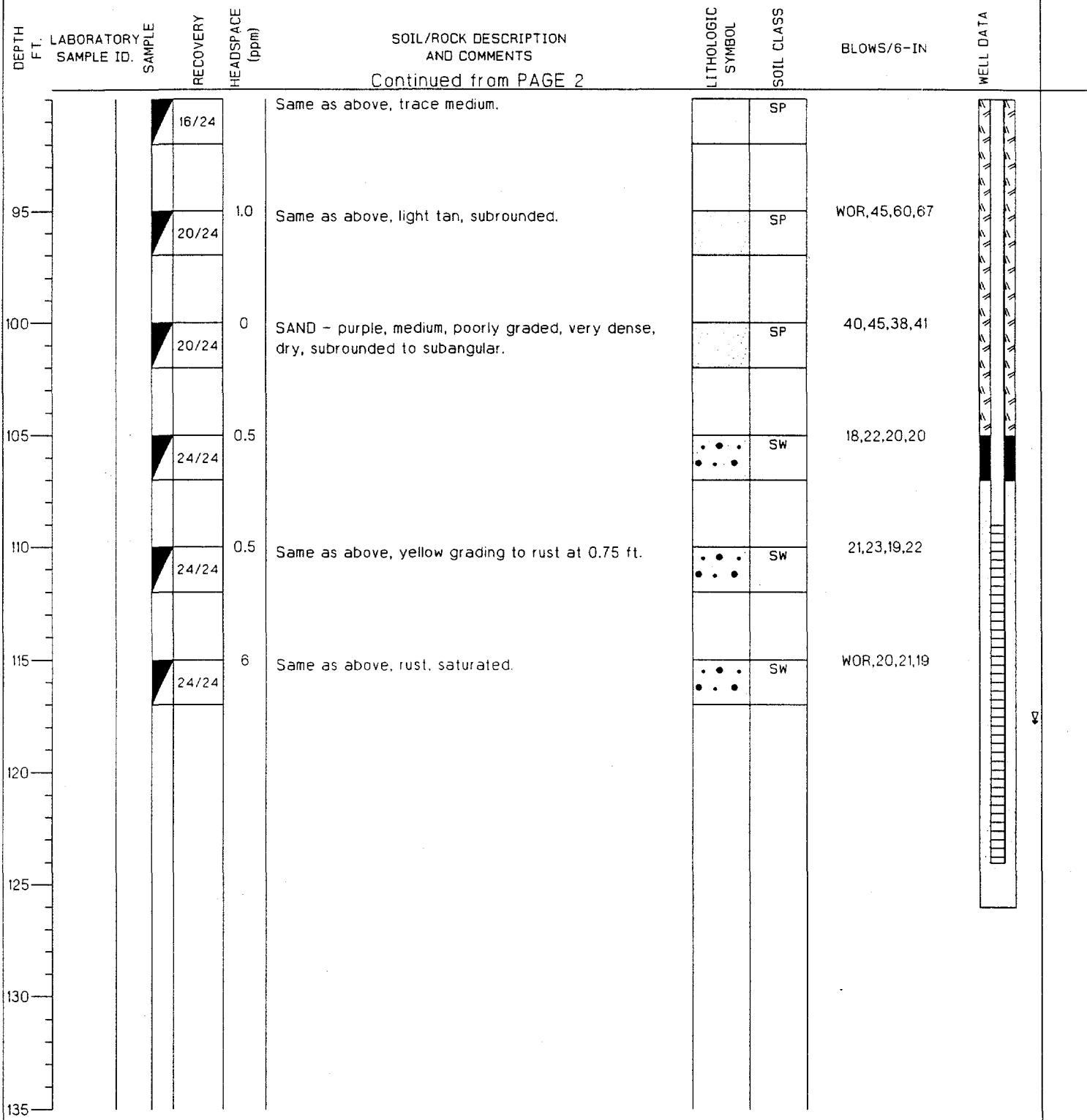


TITLE: NAVAL AIR STATION WHITING FIELD				LOG of WELL: WHF-17-3	BORING NO. N/A		
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: RI PHASE IIA			
CONTRACTOR: Groundwater Protection Inc.			DATE STARTED: 7/13/93	COMPLTD: 7/14/93			
METHOD: HSA	CASE SIZE: 2 in.		SCREEN INT.: 109-124 FT	PROTECTION LEVEL: D			
TOC ELEV.: 201.62 FEET.		MONITOR INST.: OVA	TOT DPTH: 125 FEET.	DPTH TO 117.7 FEET.			
LOGGED BY: N. Roka		WELL DEVELOPMENT DATE:		SITE: 17 - Fire Training			
DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5	22/24	BKG	SILTY SAND - orange, fine, poorly graded, loose, dry, subrounded.	/	SM	3,3,4,4	====
10	15/24	BKG	CLAYEY SAND - red, fine, some silt, poorly graded, medium dense, dry, orange, mottling.	—	SC	3,7,8,11	====
15	23/24	0.5	SILTY SAND - red, fine to medium, poorly graded, medium dense, dry, subrounded to subangular.	/	SM	7,11,7,9	====
20	16/24	0.5	SAND - light orange, fine to medium, poorly graded, medium dense.		SP	4,8,14,20	====
25	19/24	BKG	SAND - light yellow, fine to medium, poorly graded, medium dense, dry.		SP	7,10,14,16	====
30							====
35	24/24	0	SILTY SAND - light pink, trace clay, poorly graded, medium dense, moist, subrounded.	/	SM	15,11,10,11	====
40	16/24	0.5	SAND - light pink, very fine to medium, poorly graded, medium dense, dry, subrounded.		SP	5,9,16,18	====
45		0			CL	10,8,6,9	====

TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-17-3	BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/13/93	COMPLTD: 7/14/93
METHOD: HSA	CASE SIZE: 2 in.	SCREEN INT.: 109-124 FT	PROTECTION LEVEL: D
TOC ELEV.: 201.62 FEET.	MONITOR INST.: OVA	TOT DPTH: 125 FEET.	DEPTH TO 117.7 FEET.
LOGGED BY: N. Roka	WELL DEVELOPMENT DATE:		SITE: 17 - Fire Training



TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-17-3	BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/13/93	COMPLTD: 7/14/93
METHOD: HSA	CASE SIZE: 2 in.	SCREEN INT.: 109-124 FT	PROTECTION LEVEL: D
TOC ELEV.: 201.62 FEET.	MONITOR INST.: OVA	TOT DPTH: 125 FEET.	DEPTH TO 117.7 FEET.
LOGGED BY: N. Roka	WELL DEVELOPMENT DATE:		SITE: 17 - Fire Training



APPENDIX C

SOIL AND GROUNDWATER SAMPLE ANALYTICAL DATA

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22505001			22505002			22505003			22505004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-01			17-SL-02			17-SL-03			17-SL-04		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	12	U	ug/kg	12	1500	U	ug/kg	1500	12	UJ	ug/kg	12
Bromomethane	12	U	ug/kg	12	1500	U	ug/kg	1500	12	U	ug/kg	12
Vinyl chloride	12	U	ug/kg	12	1500	U	ug/kg	1500	12	U	ug/kg	12
Chloroethane	12	U	ug/kg	12	1500	U	ug/kg	1500	12	U	ug/kg	12
Methylene chloride	51	UJ	ug/kg	6	730	UJ	ug/kg	730	.8	UJ	ug/kg	6
Acetone	12	U	ug/kg	12	1500	UJ	ug/kg	1500	36	UJ	ug/kg	12
Carbon disulfide	2	J	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
1,1-Dichloroethene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
1,1-Dichloroethane	6	UJ	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
1,2-Dichloroethene (total)	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Chloroform	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
1,2-Dichloroethane	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
2-Butanone	12	UJ	ug/kg	12	1500	U	ug/kg	1500	12	U	ug/kg	12
1,1,1-Trichloroethane	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Carbon tetrachloride	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Bromodichloromethane	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
1,2-Dichloropropane	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
cis-1,3-Dichloropropene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Trichloroethene	6	U	ug/kg	6	160	J	ug/kg	730	6	U	ug/kg	6
Dibromochloromethane	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
1,1,2-Trichloroethane	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Benzene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
trans-1,3-Dichloropropene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Bromoform	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
4-Methyl-2-pentanone	12	U	ug/kg	12	1500	U	ug/kg	1500	12	U	ug/kg	12
2-Hexanone	12	UJ	ug/kg	12	1500	U	ug/kg	1500	12	U	ug/kg	12
Tetrachloroethene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Toluene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	730	UJ	ug/kg	730	6	U	ug/kg	6
Chlorobenzene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Ethylbenzene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Styrene	6	U	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6
Xylenes (total)	5	J	ug/kg	6	730	U	ug/kg	730	6	U	ug/kg	6

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22505005			22505006			22505007			22505008		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-05			17-SL-06			17-SL-07			17-SL-08		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	12	UJ	ug/kg	12	11	UJ	ug/kg	11	13	UJ	ug/kg	13
Bromomethane	12	U	ug/kg	12	11	U	ug/kg	11	13	U	ug/kg	12
Vinyl chloride	12	U	ug/kg	12	11	U	ug/kg	11	13	U	ug/kg	12
Chloroethane	12	U	ug/kg	12	11	U	ug/kg	11	13	U	ug/kg	12
Methylene chloride	12	UJ	ug/kg	6	96	UJ	ug/kg	5	9	UJ	ug/kg	6
Acetone	36	UJ	ug/kg	12	88	UJ	ug/kg	11	13	UJ	ug/kg	13
Carbon disulfide	6	U	ug/kg	6	11	U	ug/kg	5	1	J	ug/kg	6
1,1-Dichloroethene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
1,1-Dichloroethane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
1,2-Dichloroethene (total)	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Chloroform	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
1,2-Dichloroethane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
2-Butanone	12	U	ug/kg	12	11	U	ug/kg	11	13	U	ug/kg	13
1,1,1-Trichloroethane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Carbon tetrachloride	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Bromodichloromethane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
1,2-Dichloropropane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
cis-1,3-Dichloropropene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Trichloroethene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Dibromochloromethane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
1,1,2-Trichloroethane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Benzene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
trans-1,3-Dichloropropene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Bromoform	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
4-Methyl-2-pentanone	12	U	ug/kg	12	11	U	ug/kg	11	13	U	ug/kg	13
2-Hexanone	12	U	ug/kg	12	11	U	ug/kg	11	13	U	ug/kg	13
Tetrachloroethene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Toluene	6	U	ug/kg	6	2	J	ug/kg	5	7	U	ug/kg	7
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Chlorobenzene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Ethylbenzene	6	U	ug/kg	6	3	J	ug/kg	5	7	U	ug/kg	7
Styrene	6	U	ug/kg	6	5	U	ug/kg	5	7	U	ug/kg	7
Xylenes (total)	6	U	ug/kg	6	11	U	ug/kg	5	7	U	ug/kg	7

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22505009	22505010	22516001	22516002				
Site	WHITING	WHITING	WHITING	WHITING				
Locator	17-SL-09	17-SL-10	17-SL-11	17-SL-11A				
Collect Date:	15-AUG-92	15-AUG-92	16-AUG-92	16-AUG-92				
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP VOLATILES 90-SOW

Chloromethane	12	UJ	ug/kg	12	12	UJ	ug/kg	12	1500	U	ug/kg	1500	15000	U	ug/kg	15000
Bromomethane	12	U	ug/kg	12	12	U	ug/kg	12	1500	U	ug/kg	1500	15000	U	ug/kg	15000
Vinyl chloride	12	U	ug/kg	12	12	U	ug/kg	12	1500	U	ug/kg	1500	15000	U	ug/kg	15000
Chloroethane	12	U	ug/kg	12	12	U	ug/kg	12	1500	U	ug/kg	1500	15000	U	ug/kg	15000
Methylene chloride	33	UJ	ug/kg	6	34	UJ	ug/kg	6	730	UJ	ug/kg	730	7300	UJ	ug/kg	7300
Acetone	11	UJ	ug/kg	12	12	U	ug/kg	12	1500	UJ	ug/kg	1500	15000	UJ	ug/kg	15000
Carbon disulfide	1	J	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
1,1-Dichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
1,1-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
1,2-Dichloroethene (total)	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Chloroform	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
1,2-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
2-Butanone	12	U	ug/kg	12	12	U	ug/kg	12	1500	U	ug/kg	1500	15000	U	ug/kg	15000
1,1,1-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Carbon tetrachloride	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Bromodichloromethane	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
1,2-Dichloropropane	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
cis-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Trichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Dibromochloromethane	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
1,1,2-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Benzene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
trans-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Bromoform	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
4-Methyl-2-pentanone	12	U	ug/kg	12	12	U	ug/kg	12	1500	U	ug/kg	1500	15000	U	ug/kg	15000
2-Hexanone	12	U	ug/kg	12	12	U	ug/kg	12	1500	U	ug/kg	1500	15000	U	ug/kg	15000
Tetrachloroethene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Toluene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	6	U	ug/kg	6	730	UJ	ug/kg	730	7300	UJ	ug/kg	7300
Chlorobenzene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Ethylbenzene	6	U	ug/kg	6	6	U	ug/kg	6	5000	U	ug/kg	730	12000	U	ug/kg	7300
Styrene	6	U	ug/kg	6	6	U	ug/kg	6	730	U	ug/kg	730	7300	U	ug/kg	7300
Xylenes (total)	4	J	ug/kg	6	3	J	ug/kg	6	30000	E	ug/kg	730	84000	ug/kg	7300	

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22514011	22514012	22514012R	22514013								
Site	WHITING	WHITING	WHITING	WHITING								
Locator	17-SL-12	17-SL-13	17-SL-13_R	17-SL-14								
Collect Date:	16-AUG-92	16-AUG-92	16-AUG-92	16-AUG-92								
	VALUE	QUAL UNITS	DL	VALUE								
CLP VOLATILES 90-SOW												
Chloromethane	15 UJ	ug/kg	15	58 UJ	ug/kg	58	58 UJ	ug/kg	58	57 UJ	ug/kg	57
Bromomethane	15 U	ug/kg	15	58 UJ	ug/kg	58	58 UJ	ug/kg	58	57 UJ	ug/kg	57
Vinyl chloride	15 U	ug/kg	15	58 UJ	ug/kg	58	58 UJ	ug/kg	58	57 UJ	ug/kg	57
Chloroethane	15 U	ug/kg	15	58 UJ	ug/kg	58	58 UJ	ug/kg	58	57 UJ	ug/kg	57
Methylene chloride	48 UJ	ug/kg	9	62 UJ	ug/kg	140	90 UJ	ug/kg	140	160 UJ	ug/kg	140
Acetone	270 UJ	ug/kg	18	140 UJ	ug/kg	290	120 UJ	ug/kg	290	390 UJ	ug/kg	280
Carbon disulfide	2 J	ug/kg	9	29 UJ	ug/kg	29	29 UJ	ug/kg	29	26 J	ug/kg	140
1,1-Dichloroethene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
1,1-Dichloroethane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
1,2-Dichloroethene (total)	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Chloroform	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
1,2-Dichloroethane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
2-Butanone	55 ug/kg	18	58 UJ	ug/kg	58	58 UJ	ug/kg	58	80 J	ug/kg	280	
1,1,1-Trichloroethane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Carbon tetrachloride	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Bromodichloromethane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
1,2-Dichloropropane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
cis-1,3-Dichloropropene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Trichloroethene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Dibromochloromethane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
1,1,2-Trichloroethane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Benzene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
trans-1,3-Dichloropropene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Bromoform	7 UJ	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
4-Methyl-2-pentanone	15 U	ug/kg	15	58 UJ	ug/kg	58	58 UJ	ug/kg	58	57 UJ	ug/kg	57
2-Hexanone	15 U	ug/kg	15	58 UJ	ug/kg	58	58 UJ	ug/kg	58	57 UJ	ug/kg	57
Tetrachloroethene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Toluene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	38 J	ug/kg	140
1,1,2,2-Tetrachloroethane	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Chlorobenzene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Ethylbenzene	2 J	ug/kg	9	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Styrene	7 U	ug/kg	7	29 UJ	ug/kg	29	29 UJ	ug/kg	29	28 UJ	ug/kg	28
Xylenes (total)	38 ug/kg	9	29 UJ	ug/kg	29	29 UJ	ug/kg	29	570 J	ug/kg	140	

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22514013R			22520001			22520002			22520002R		
Site	WHITING			WHITING	WHITING			WHITING	WHITING			
Locator	17-SL-14_R			17-SL-15	17-SL-16	15-AUG-92			15-AUG-92	17-SL-16_R	15-AUG-92	
Collect Date:	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	57	UJ	ug/kg	57	11	U	ug/kg	11	12	UJ	ug/kg	12
Bromomethane	57	UJ	ug/kg	57	11	U	ug/kg	11	12	UJ	ug/kg	12
Vinyl chloride	57	UJ	ug/kg	57	11	U	ug/kg	11	12	UJ	ug/kg	12
Chloroethane	57	UJ	ug/kg	57	11	U	ug/kg	11	12	UJ	ug/kg	12
Methylene chloride	91	UJ	ug/kg	140	15	UJ	ug/kg	6	130	J	ug/kg	6
Acetone	270	UJ	ug/kg	280	19	UJ	ug/kg	11	12	UJ	ug/kg	12
Carbon disulfide	9	J	ug/kg	140	6	U	ug/kg	6	5	J	ug/kg	6
1,1-Dichloroethene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
1,1-Dichloroethane	28	UJ	ug/kg	28	6	UJ	ug/kg	6	6	UJ	ug/kg	6
1,2-Dichloroethene (total)	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Chloroform	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
1,2-Dichloroethane	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
2-Butanone	52	J	ug/kg	280	11	UJ	ug/kg	11	12	UJ	ug/kg	12
1,1,1-Trichloroethane	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Carbon tetrachloride	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Bromodichloromethane	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
1,2-Dichloropropane	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
cis-1,3-Dichloropropene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Trichloroethene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Dibromochloromethane	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
1,1,2-Trichloroethane	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Benzene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
trans-1,3-Dichloropropene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Bromoform	28	UJ	ug/kg	28	6	UJ	ug/kg	6	6	UJ	ug/kg	6
4-Methyl-2-pentanone	57	R	ug/kg	57	11	U	ug/kg	11	12	UJ	ug/kg	12
2-Hexanone	57	UJ	ug/kg	57	11	U	ug/kg	11	12	UJ	ug/kg	12
Tetrachloroethene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Toluene	31	J	ug/kg	140	6	U	ug/kg	6	6	UJ	ug/kg	6
1,1,2,2-Tetrachloroethane	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Chlorobenzene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Ethylbenzene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Styrene	28	UJ	ug/kg	28	6	U	ug/kg	6	6	UJ	ug/kg	6
Xylenes (total)	500	J	ug/kg	140	6	U	ug/kg	6	3	J	ug/kg	6
										5	J	ug/kg

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22514014	Site	WHITING	Locator	17-SL-17	Collect Date:	16-AUG-92	22514008	WHITING	17-SL-17A	16-AUG-92	22520004	WHITING	17-SL-18	15-AUG-92	22520003	WHITING	17-SL-19	15-AUG-92
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	
CLP VOLATILES 90-SOW																			
Chloromethane	1500	U	ug/kg	1500	1500	U	ug/kg	1500	12	U	ug/kg	12	6000	UJ	ug/kg	6000			
Bromomethane	1500	U	ug/kg	1500	1500	U	ug/kg	1500	12	U	ug/kg	12	6000	UJ	ug/kg	6000			
Vinyl chloride	1500	U	ug/kg	1500	1500	U	ug/kg	1500	12	U	ug/kg	12	6000	UJ	ug/kg	6000			
Chloroethane	1500	U	ug/kg	1500	1500	U	ug/kg	1500	12	U	ug/kg	12	6000	UJ	ug/kg	6000			
Methylene chloride	740	UJ	ug/kg	7	730	UJ	ug/kg	7	9	UJ	ug/kg	6	3000	UJ	ug/kg	3000			
Acetone	1500	UJ	ug/kg	15	1500	UJ	ug/kg	14	56	UJ	ug/kg	12	6000	UJ	ug/kg	6000			
Carbon disulfide	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
1,1-Dichloroethene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
1,1-Dichloroethane	740	U	ug/kg	740	730	U	ug/kg	730	6	UJ	ug/kg	6	3000	UJ	ug/kg	3000			
1,2-Dichloroethene (total)	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Chloroform	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
1,2-Dichloroethane	740	U	ug/kg	740	730	UJ	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
2-Butanone	1500	UJ	ug/kg	1500	1500	U	ug/kg	1500	12	UJ	ug/kg	12	6000	UJ	ug/kg	6000			
1,1,1-Trichloroethane	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Carbon tetrachloride	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Bromodichloromethane	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
1,2-Dichloropropane	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
cis-1,3-Dichloropropene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Trichloroethene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Dibromochloromethane	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
1,1,2-Trichloroethane	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Benzene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
trans-1,3-Dichloropropene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Bromoform	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
4-Methyl-2-pentanone	1500	UJ	ug/kg	1500	1500	UJ	ug/kg	1500	12	U	ug/kg	12	6000	UJ	ug/kg	6000			
2-Hexanone	1500	UJ	ug/kg	1500	1500	UJ	ug/kg	1500	12	UJ	ug/kg	12	6000	UJ	ug/kg	6000			
Tetrachloroethene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Toluene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	23000	J	ug/kg	3000			
1,1,2,2-Tetrachloroethane	740	UJ	ug/kg	740	730	UJ	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Chlorobenzene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Ethylbenzene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	14000	J	ug/kg	3000			
Styrene	740	U	ug/kg	740	730	U	ug/kg	730	6	U	ug/kg	6	3000	UJ	ug/kg	3000			
Xylenes (total)	340	J	ug/kg	7	730	U	ug/kg	730	6	U	ug/kg	6	130000	J	ug/kg	3000			

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22520003R			22514015			22516003			22516004						
Site	WHITING			WHITING			WHITING			WHITING						
Locator	17-SL-19_R			17-SL-20			17-SL-21			17-SL-21A						
Collect Date:	15-AUG-92			16-AUG-92			16-AUG-92			16-AUG-92						
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL				
CLP VOLATILES 90-SOW																
Chloromethane	6000	UJ	ug/kg	6000	60	U	ug/kg	60	1500	U	ug/kg	1500				
Bromomethane	6000	UJ	ug/kg	6000	60	U	ug/kg	60	1500	U	ug/kg	1500				
Vinyl chloride	6000	UJ	ug/kg	6000	60	U	ug/kg	60	1500	U	ug/kg	1500				
Chloroethane	6000	UJ	ug/kg	6000	60	U	ug/kg	60	1500	U	ug/kg	1500				
Methylene chloride	4600	UJ	ug/kg	3000	61	UJ	ug/kg	150	740	UJ	ug/kg	740				
Acetone	6600	UJ	ug/kg	6000	110	UJ	ug/kg	300	1500	UJ	ug/kg	1500				
Carbon disulfide	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
1,1-Dichloroethene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
1,1-Dichloroethane	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
1,2-Dichloroethene (total)	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Chloroform	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
1,2-Dichloroethane	3000	UJ	ug/kg	3000	30	UJ	ug/kg	30	740	U	ug/kg	740				
2-Butanone	6000	UJ	ug/kg	6000	60	U	ug/kg	60	1500	U	ug/kg	1500				
1,1,1-Trichloroethane	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Carbon tetrachloride	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Bromodichloromethane	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
1,2-Dichloropropane	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
cis-1,3-Dichloropropene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Trichloroethene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Dibromochloromethane	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
1,1,2-Trichloroethane	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Benzene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
trans-1,3-Dichloropropene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Bromoform	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
4-Methyl-2-pentanone	6000	UJ	ug/kg	6000	60	R	ug/kg	60	1500	U	ug/kg	1500				
2-Hexanone	6000	UJ	ug/kg	6000	60	UJ	ug/kg	60	1500	U	ug/kg	1500				
Tetrachloroethene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Toluene	11000	J	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
1,1,2,2-Tetrachloroethane	3000	UJ	ug/kg	3000	30	UJ	ug/kg	30	740	UJ	ug/kg	740				
Chlorobenzene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740				
Ethylbenzene	6900	J	ug/kg	3000	6	J	ug/kg	150	1100	ug/kg	740	510	J	ug/kg	720	
Styrene	3000	UJ	ug/kg	3000	30	U	ug/kg	30	740	U	ug/kg	740	720	U	ug/kg	720
Xylenes (total)	70000	J	ug/kg	3000	19	J	ug/kg	150	9600	ug/kg	740	3700	ug/kg	720		

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22514001			22514002			22514003			22514004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-22			17-SL-23			17-SL-24			17-SL-25		
Collect Date:	16-AUG-92			16-AUG-92			16-AUG-92			16-AUG-92		
	VALUE	QUAL UNITS	DL									
CLP VOLATILES 90-SOW												
Chloromethane	11 U	ug/kg	11	11 U	ug/kg	11	11 UJ	ug/kg	11	12 UJ	ug/kg	12
Bromomethane	11 U	ug/kg	11	11 U	ug/kg	11	11 U	ug/kg	11	12 U	ug/kg	12
Vinyl chloride	11 U	ug/kg	11	11 U	ug/kg	11	11 U	ug/kg	11	12 U	ug/kg	12
Chloroethane	11 U	ug/kg	11	11 U	ug/kg	11	11 U	ug/kg	11	12 U	ug/kg	12
Methylene chloride	21 UJ	ug/kg	6	15 UJ	ug/kg	6	13 UJ	ug/kg	6	31 UJ	ug/kg	6
Acetone	55 UJ	ug/kg	11	36 UJ	ug/kg	11	17 UJ	ug/kg	11	41 UJ	ug/kg	12
Carbon disulfide	6 U	ug/kg	6	6 U	ug/kg	6	6 U	ug/kg	6	1 J	ug/kg	6
1,1-Dichloroethene	6 U	ug/kg	6									
1,1-Dichloroethane	6 U	ug/kg	6									
1,2-Dichloroethene (total)	6 U	ug/kg	6									
Chloroform	6 U	ug/kg	6									
1,2-Dichloroethane	6 U	ug/kg	6									
2-Butanone	11 U	ug/kg	11	11 UJ	ug/kg	11	11 U	ug/kg	11	12 U	ug/kg	12
1,1,1-Trichloroethane	6 U	ug/kg	6									
Carbon tetrachloride	6 U	ug/kg	6									
Bromodichloromethane	6 U	ug/kg	6									
1,2-Dichloropropane	6 U	ug/kg	6									
cis-1,3-Dichloropropene	6 U	ug/kg	6									
Trichloroethene	6 U	ug/kg	6									
Dibromochloromethane	6 U	ug/kg	6									
1,1,2-Trichloroethane	6 U	ug/kg	6									
Benzene	6 U	ug/kg	6									
trans-1,3-Dichloropropene	6 U	ug/kg	6									
Bromoform	6 U	ug/kg	6	6 U	ug/kg	6	6 UJ	ug/kg	6	6 UJ	ug/kg	6
4-Methyl-2-pentanone	11 U	ug/kg	11	11 R	ug/kg	11	11 U	ug/kg	11	12 U	ug/kg	12
2-Hexanone	11 U	ug/kg	11	11 UJ	ug/kg	11	11 U	ug/kg	11	12 U	ug/kg	12
Tetrachloroethene	6 U	ug/kg	6									
Toluene	6 U	ug/kg	6									
1,1,2,2-Tetrachloroethane	6 U	ug/kg	6	6 UJ	ug/kg	6	6 U	ug/kg	6	6 U	ug/kg	6
Chlorobenzene	6 U	ug/kg	6									
Ethylbenzene	6 U	ug/kg	6									
Styrene	6 U	ug/kg	6									
Xylenes (total)	6 U	ug/kg	6	27	ug/kg	6	6 U	ug/kg	6	6 U	ug/kg	6

U= NOT DETECTED J=ESTIMATED VALUE

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NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22514005			22514006			22514007			22520005		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-26			17-SL-27			17-SL-28			17-SL-29		
Collect Date:	16-AUG-92			16-AUG-92			16-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	11	UJ	ug/kg	11	12	U	ug/kg	12	11	UJ	ug/kg	11
Bromomethane	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11
Vinyl chloride	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11
Chloroethane	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11
Methylene chloride	19	UJ	ug/kg	6	22	UJ	ug/kg	6	26	UJ	ug/kg	6
Acetone	20	UJ	ug/kg	11	32	UJ	ug/kg	12	59	UJ	ug/kg	11
Carbon disulfide	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloroethene (total)	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Chloroform	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
2-Butanone	11	U	ug/kg	11	6	J	ug/kg	12	11	U	ug/kg	11
1,1,1-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Carbon tetrachloride	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Bromodichloromethane	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloropropane	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
cis-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Trichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Dibromochloromethane	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Benzene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
trans-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Bromoform	6	UJ	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
4-Methyl-2-pentanone	11	U	ug/kg	11	12	R	ug/kg	12	11	UJ	ug/kg	11
2-Hexanone	11	U	ug/kg	11	12	UJ	ug/kg	12	11	U	ug/kg	11
Tetrachloroethene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Toluene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	6	UJ	ug/kg	6	6	U	ug/kg	6
Chlorobenzene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Ethylbenzene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Styrene	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Xylenes (total)	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6

U= NOT DETECTED J=ESTIMATED VALUE

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R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22520005R			22520006			22520007			22520008		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-29_R			17-SL-30			17-SL-31			17-SL-32		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	12	UJ	ug/kg	12	11	U	ug/kg	11	12	U	ug/kg	12
Bromomethane	12	UJ	ug/kg	12	11	U	ug/kg	11	12	U	ug/kg	11
Vinyl chloride	12	UJ	ug/kg	12	11	U	ug/kg	11	12	U	ug/kg	11
Chloroethane	12	UJ	ug/kg	12	11	U	ug/kg	11	12	U	ug/kg	11
Methylene chloride	39	UJ	ug/kg	6	11	UJ	ug/kg	5	32	UJ	ug/kg	6
Acetone	14	UJ	ug/kg	12	11	UJ	ug/kg	11	34	UJ	ug/kg	12
Carbon disulfide	4	J	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1-Dichloroethene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1-Dichloroethane	6	UJ	ug/kg	6	5	UJ	ug/kg	5	6	U	ug/kg	6
1,2-Dichloroethene (total)	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Chloroform	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,2-Dichloroethane	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
2-Butanone	12	UJ	ug/kg	12	11	UJ	ug/kg	11	12	U	ug/kg	12
1,1,1-Trichloroethane	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Carbon tetrachloride	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Bromodichloromethane	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,2-Dichloropropane	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
cis-1,3-Dichloropropene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Trichloroethene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Dibromochloromethane	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1,2-Trichloroethane	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Benzene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
trans-1,3-Dichloropropene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Bromoform	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
4-Methyl-2-pentanone	12	UJ	ug/kg	12	11	UJ	ug/kg	11	12	U	ug/kg	12
2-Hexanone	12	UJ	ug/kg	12	11	U	ug/kg	11	12	U	ug/kg	12
Tetrachloroethene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Toluene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Chlorobenzene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Ethylbenzene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Styrene	6	UJ	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Xylenes (total)	2	J	ug/kg	6	1	J	ug/kg	5	3	J	ug/kg	6

U= NOT DETECTED J=ESTIMATED VALUE

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R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- VOLATILES -- REPORT NO. 10625

Lab Sample Number:	22520009	22520010
Site	WHITING	WHITING
Locator	17-SL-33	17-SL-34
Collect Date:	15-AUG-92	15-AUG-92

VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL
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CLP VOLATILES 90-SOW

Chloromethane	11 U	ug/kg	11	11 U	ug/kg	11
Bromomethane	11 U	ug/kg	11	11 U	ug/kg	11
Vinyl chloride	11 U	ug/kg	11	11 U	ug/kg	11
Chloroethane	11 U	ug/kg	11	11 U	ug/kg	11
Methylene chloride	25 UJ	ug/kg	6	37 UJ	ug/kg	6
Acetone	11 UJ	ug/kg	11	11 UJ	ug/kg	11
Carbon disulfide	2 J	ug/kg	6	3 J	ug/kg	6
1,1-Dichloroethene	6 U	ug/kg	6	6 U	ug/kg	6
1,1-Dichloroethane	6 U	ug/kg	6	6 U	ug/kg	6
1,2-Dichloroethene (total)	6 U	ug/kg	6	6 U	ug/kg	6
Chloroform	6 U	ug/kg	6	6 U	ug/kg	6
1,2-Dichloroethane	6 U	ug/kg	6	6 U	ug/kg	6
2-Butanone	11 U	ug/kg	11	11 U	ug/kg	11
1,1,1-Trichloroethane	6 U	ug/kg	6	6 U	ug/kg	6
Carbon tetrachloride	6 U	ug/kg	6	6 U	ug/kg	6
Bromodichloromethane	6 U	ug/kg	6	6 U	ug/kg	6
1,2-Dichloropropane	6 U	ug/kg	6	6 U	ug/kg	6
cis-1,3-Dichloropropene	6 U	ug/kg	6	6 U	ug/kg	6
Trichloroethene	6 U	ug/kg	6	6 U	ug/kg	6
Dibromochloromethane	6 U	ug/kg	6	6 U	ug/kg	6
1,1,2-Trichloroethane	6 U	ug/kg	6	6 U	ug/kg	6
Benzene	6 U	ug/kg	6	6 U	ug/kg	6
trans-1,3-Dichloropropene	6 U	ug/kg	6	6 U	ug/kg	6
Bromoform	6 U	ug/kg	6	6 U	ug/kg	6
4-Methyl-2-pentanone	11 U	ug/kg	11	11 U	ug/kg	11
2-Hexanone	11 U	ug/kg	11	11 U	ug/kg	11
Tetrachloroethene	6 U	ug/kg	6	6 U	ug/kg	6
Toluene	6 U	ug/kg	6	6 U	ug/kg	6
1,1,2,2-Tetrachloroethane	6 U	ug/kg	6	6 U	ug/kg	6
Chlorobenzene	6 U	ug/kg	6	6 U	ug/kg	6
Ethylbenzene	6 U	ug/kg	6	6 U	ug/kg	6
Styrene	6 U	ug/kg	6	6 U	ug/kg	6
Xylenes (total)	5 J	ug/kg	6	2 J	ug/kg	6

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING -- SITE 17
 SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22505001			22505002			22505003			22505004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-01			17-SL-02			17-SL-03			17-SL-04		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW												
Phenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
bis(2-Chloroethyl) ether	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2-Chlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
1,3-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
1,4-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
1,2-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2-Methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,2-oxybis(1-Chloropropane)	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
4-Methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
N-Nitroso-di-n-propylamine	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Hexachloroethane	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Nitrobenzene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Isophorone	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2-Nitrophenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,4-Dimethylphenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
bis(2-Chloroethoxy) methane	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,4-Dichlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
1,2,4-Trichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Naphthalene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
4-Chloroaniline	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Hexachlorobutadiene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
4-Chloro-3-methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2-Methylnaphthalene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Hexachlorocyclopentadiene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,4,6-Trichlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,4,5-Trichlorophenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
2-Chloronaphthalene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2-Nitroaniline	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Dimethylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Acenaphthylene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,6-Dinitrotoluene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
3-Nitroaniline	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Acenaphthene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,4-Dinitrophenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
4-Nitrophenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Dibenzofuran	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
2,4-Dinitrotoluene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Diethylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
4-chlorophenyl-phenylether	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Fluorene	380	UJ	ug/kg	380	390	UJ	ug/kg	390	390	UJ	ug/kg	390
4-Nitroaniline	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
4,6-Dinitro-2-methylphenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
N-Nitrosodiphenylamine	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
4-Bromophenyl-phenylether	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Hexachlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Pentachlorophenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Phenanthrene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Anthracene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Carbazole												
Di-n-butylphthalate	380	UJ	ug/kg	380	390	UJ	ug/kg	390	390	UJ	ug/kg	390

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22505001			22505002			22505003			22505004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-01			17-SL-02			17-SL-03			17-SL-04		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Pyrene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Butylbenzylphthalate	360	J	ug/kg	380	390	U	ug/kg	390	490	ug/kg	390	390
3,3-Dichlorobenzidine	770	U	ug/kg	770	780	U	ug/kg	780	790	U	ug/kg	790
Benzo (a) anthracene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Chrysene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
bis(2-Ethylhexyl) phthalate	49	J	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Di-n-octylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Benzo (b) fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Benzo (k) fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Benzo (a) pyrene	380	U	ug/kg	380	390	U	ug/kg	390	390	U	ug/kg	390
Indeno (1,2,3-cd) pyrene	380	UJ	ug/kg	380	390	UJ	ug/kg	390	390	UJ	ug/kg	390
Dibenzo (a,h) anthracene	380	UJ	ug/kg	380	390	UJ	ug/kg	390	390	UJ	ug/kg	390
Benzo (g,h,i) perylene	380	UJ	ug/kg	380	390	UJ	ug/kg	390	390	UJ	ug/kg	390

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22505005			22505006			22505007			22505008		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-05			17-SL-06			17-SL-07			17-SL-08		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW												
Phenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
bis(2-Chloroethyl) ether	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2-Chlorophenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
1,3-Dichlorobenzene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
1,4-Dichlorobenzene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
1,2-Dichlorobenzene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2-Methylphenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,2-oxybis(1-Chloropropane)	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
4-Methylphenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
N-Nitroso-di-n-propylamine	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Hexachloroethane	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Nitrobenzene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Isophorone	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2-Nitrophenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,4-Dimethylphenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
bis(2-Chloroethoxy) methane	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,4-Dichlorophenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
1,2,4-Trichlorobenzene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Naphthalene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
4-Chloroaniline	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Hexachlorobutadiene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
4-Chloro-3-methylphenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2-Methylnaphthalene	400	U	ug/kg	400	190	J	ug/kg	720	400	U	ug/kg	410
Hexachlorocyclopentadiene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,4,6-Trichlorophenol	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,4,5-Trichlorophenol	2000	U	ug/kg	2000	3500	U	ug/kg	3500	1900	U	ug/kg	1900
2-Chloronaphthalene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2-Nitroaniline	2000	U	ug/kg	2000	3500	U	ug/kg	3500	1900	U	ug/kg	1900
Dimethylphthalate	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Acenaphthylene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,6-Dinitrotoluene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
3-Nitroaniline	2000	UJ	ug/kg	2000	3500	UJ	ug/kg	3500	1900	UJ	ug/kg	1900
Acenaphthene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,4-Dinitrophenol	2000	UJ	ug/kg	2000	3500	UJ	ug/kg	3500	1900	UJ	ug/kg	1900
4-Nitrophenol	2000	U	ug/kg	2000	3500	U	ug/kg	3500	1900	U	ug/kg	1900
Dibenzofuran	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
2,4-Dinitrotoluene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Diethylphthalate	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
4-Chlorophenyl-phenylether	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410
Fluorene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	410

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22505005			22505006			22505007			22505008		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-05			17-SL-06			17-SL-07			17-SL-08		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	2000	UJ	ug/kg	2000	3500	UJ	ug/kg	3500	1900	UJ	ug/kg	1900
4,6-Dinitro-2-methylphenol	2000	UJ	ug/kg	2000	3500	UJ	ug/kg	3500	1900	UJ	ug/kg	1900
N-Nitrosodiphenylamine	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
4-Bromophenyl-phenylether	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Hexachlorobenzene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Pentachlorophenol	2000	U	ug/kg	2000	3500	U	ug/kg	3500	1900	U	ug/kg	1900
Phenanthrene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Anthracene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Carbazole	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate	400	UJ	ug/kg	400	730	U	ug/kg	730	400	UJ	ug/kg	400
Fluoranthene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Pyrene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Butylbenzylphthalate	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
3,3-Dichlorobenzidine	810	UJ	ug/kg	810	1500	UJ	ug/kg	1500	800	UJ	ug/kg	800
Benzo (a) anthracene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Chrysene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
bis(2-Ethylhexyl) phthalate	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Di-n-octylphthalate	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Benzo (b) fluoranthene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Benzo (k) fluoranthene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Benzo (a) pyrene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Indeno (1,2,3-cd) pyrene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Dibenzo (a,h) anthracene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400
Benzo (g,h,i) perylene	400	U	ug/kg	400	730	U	ug/kg	730	400	U	ug/kg	400

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22505009	22505010	22516001	22516002							
Site	WHITING	WHITING	WHITING	WHITING							
Locator	17-SL-09	17-SL-10	17-SL-11	17-SL-11A							
Collect Date:	15-AUG-92	15-AUG-92	16-AUG-92	16-AUG-92							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP SEMIVOLATILES 90-SOW

Phenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
bis(2-Chloroethyl) ether	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2-Chlorophenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
1,3-Dichlorobenzene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
1,4-Dichlorobenzene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
1,2-Dichlorobenzene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2-Methylphenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,2-oxybis(1-chloropropane)	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
4-Methylphenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
N-Nitroso-di-n-propylamine	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Hexachloroethane	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Nitrobenzene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Isophorone	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2-Nitrophenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,4-Dimethylphenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
bis(2-Chloroethoxy) methane	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,4-Dichlorophenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
1,2,4-Trichlorobenzene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Naphthalene	390	U	ug/kg	390	380	U	ug/kg	380	1100	J	ug/kg	1200
4-Chloroaniline	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Hexachlorobutadiene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
4-Chloro-3-methylphenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2-Methylnaphthalene	390	U	ug/kg	390	380	U	ug/kg	380	1400	U	ug/kg	1200
Hexachlorocyclopentadiene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,4,6-Trichlorophenol	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,4,5-Trichlorophenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	5600	U	ug/kg	5600
2-Chloronaphthalene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2-Nitroaniline	1900	U	ug/kg	1900	1900	U	ug/kg	1900	5600	U	ug/kg	5600
Dimethylphthalate	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Acenaphthylene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,6-Dinitrotoluene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
3-Nitroaniline	1900	UJ	ug/kg	1900	1900	UJ	ug/kg	1900	5600	U	ug/kg	5600
Acenaphthene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,4-Dinitrophenol	1900	UJ	ug/kg	1900	1900	U	ug/kg	1900	5600	UJ	ug/kg	5600
4-Nitrophenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	5600	U	ug/kg	5600
Dibenzofuran	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
2,4-Dinitrotoluene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Diethylphthalate	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
4-Chlorophenyl-phenylether	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Fluorene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22505009			22505010			22516001			22516002		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-09			17-SL-10			17-SL-11			17-SL-11A		
Collect Date:	15-AUG-92			15-AUG-92			16-AUG-92			16-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	1900	UJ	ug/kg	1900	1900	UJ	ug/kg	1900	5600	U	ug/kg	5600
4,6-Dinitro-2-methylphenol	1900	UJ	ug/kg	1900	1900	U	ug/kg	1900	5600	U	ug/kg	5600
N-Nitrosodiphenylamine	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
4-Bromophenyl-phenylether	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Hexachlorobenzene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Pentachlorophenol	1900	U	ug/kg	1900	1900	U	ug/kg	1900	5600	U	ug/kg	5600
Phenanthrene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Anthracene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Carbazole												
Di-n-butylphthalate	390	U	ug/kg	390	380	UJ	ug/kg	380	1200	U	ug/kg	1200
Fluoranthene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Pyrene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Butylbenzylphthalate	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
3,3-Dichlorobenzidine	780	UJ	ug/kg	780	770	UJ	ug/kg	770	2300	U	ug/kg	2300
Benzo (a) anthracene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Chrysene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
bis(2-Ethylhexyl) phthalate	390	U	ug/kg	390	380	U	ug/kg	380	430	J	ug/kg	1200
Di-n-octylphthalate	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Benzo (b) fluoranthene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Benzo (k) fluoranthene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Benzo (a) pyrene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Indeno (1,2,3-cd) pyrene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Dibenz(a,h) anthracene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200
Benzo (g,h,i) perylene	390	U	ug/kg	390	380	U	ug/kg	380	1200	U	ug/kg	1200

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22514011	22514012	22514013	22520001							
Site	WHITING	WHITING	WHITING	WHITING							
Locator	17-SL-12	17-SL-13	17-SL-14	17-SL-15							
Collect Date:	16-AUG-92	16-AUG-92	16-AUG-92	15-AUG-92							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP SEMIVOLATILES 90-SOW

Phenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
bis(2-Chloroethyl) ether	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2-Chlorophenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
1,3-Dichlorobenzene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
1,4-Dichlorobenzene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
1,2-Dichlorobenzene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2-Methylphenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,2-oxybis(1-Chloropropane)	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
4-Methylphenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
N-Nitroso-di-n-propylamine	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Hexachloroethane	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Nitrobenzene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Isophorone	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2-Nitrophenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,4-Dimethylphenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
bis(2-Chloroethoxy) methane	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,4-Dichlorophenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
1,2,4-Trichlorobenzene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Naphthalene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	7200	U	ug/kg	6100	370	U	ug/kg	370
4-Chloroaniline	1500	UJ	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Hexachlorobutadiene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
4-Chloro-3-methylphenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2-Methylnaphthalene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Hexachlorocyclopentadiene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,4,6-Trichlorophenol	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,4,5-Trichlorophenol	7400	U	ug/kg	7400	5600	U	ug/kg	5600	30000	U	ug/kg	30000	1800	U	ug/kg	1800
2-Chloronaphthalene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2-Nitroaniline	7400	U	ug/kg	7400	5600	U	ug/kg	5600	30000	U	ug/kg	30000	1800	U	ug/kg	1800
Dimethylphthalate	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Acenaphthylene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,6-Dinitrotoluene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
3-Nitroaniline	7400	UJ	ug/kg	7400	5600	U	ug/kg	5600	30000	U	ug/kg	30000	1800	U	ug/kg	1800
Acenaphthene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,4-Dinitrophenol	7400	UJ	ug/kg	7400	5600	U	ug/kg	5600	30000	UJ	ug/kg	30000	1800	U	ug/kg	1800
4-Nitrophenol	7400	U	ug/kg	7400	5600	UJ	ug/kg	5600	30000	U	ug/kg	30000	1800	U	ug/kg	1800
Dibenzofuran	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
2,4-Dinitrotoluene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Diethylphthalate	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
4-Chlorophenyl-phenylether	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	U	ug/kg	370
Fluorene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100	370	UJ	ug/kg	370

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22514011			22514012			22514013			22520001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-12			17-SL-13			17-SL-14			17-SL-15		
Collect Date:	16-AUG-92			16-AUG-92			16-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	7400	UJ	ug/kg	7400	5600	UJ	ug/kg	5600	30000	U	ug/kg	30000
4,6-Dinitro-2-methylphenol	7400	UJ	ug/kg	7400	5600	U	ug/kg	5600	30000	U	ug/kg	30000
N-Nitrosodiphenylamine	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
4-Bromophenyl-phenylether	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Hexachlorobenzene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Pentachlorophenol	7400	U	ug/kg	7400	5600	U	ug/kg	5600	30000	U	ug/kg	30000
Phenanthrene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Anthracene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Carbazole												
Di-n-butylphthalate	1500	U	ug/kg	1500	1200	UJ	ug/kg	1200	6100	U	ug/kg	6100
Fluoranthene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Pyrene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Butylbenzylphthalate	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
3,3-Dichlorobenzidine	3100	UJ	ug/kg	3100	2300	U	ug/kg	2300	12000	U	ug/kg	12000
Benzo (a) anthracene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Chrysene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
bis(2-Ethylhexyl) phthalate	1500	U	ug/kg	1500	210	J	ug/kg	1200	6100	U	ug/kg	6100
Di-n-octylphthalate	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Benzo (b) fluoranthene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Benzo (k) fluoranthene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Benzo (a) pyrene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Indeno (1,2,3-cd) pyrene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Dibenzo (a,h) anthracene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100
Benzo (g,h,i) perylene	1500	U	ug/kg	1500	1200	U	ug/kg	1200	6100	U	ug/kg	6100

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22520002			22514014			22514008			22520004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-16			17-SL-17			17-SL-17A			17-SL-18		
Collect Date:	15-AUG-92			16-AUG-92			16-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW												
Phenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	400
bis(2-Chloroethyl) ether	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2-Chlorophenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
1,3-Dichlorobenzene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
1,4-Dichlorobenzene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
1,2-Dichlorobenzene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2-Methylphenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,2-oxybis(1-Chloropropane)	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
4-Methylphenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
N-Nitroso-di-n-propylamine	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Hexachloroethane	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Nitrobenzene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Isophorone	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2-Nitrophenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,4-Dimethylphenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
bis(2-Chloroethoxy) methane	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,4-Dichlorophenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
1,2,4-Trichlorobenzene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Naphthalene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
4-Chloroaniline	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Hexachlorobutadiene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
4-Chloro-3-methylphenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2-Methylnaphthalene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Hexachlorocyclopentadiene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,4,6-Trichlorophenol	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,4,5-Trichlorophenol	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1900	U	ug/kg	1900
2-Chloronaphthalene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2-Nitroaniline	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Dimethylphthalate	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Acenaphthylene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,6-Dinitrotoluene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
3-Nitroaniline	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Acenaphthene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,4-Dinitrophenol	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1900	U	ug/kg	1900
4-Nitrophenol	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Dibenzofuran	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
2,4-Dinitrotoluene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Diethylphthalate	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
4-Chlorophenyl-phenylether	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Fluorene	400	UJ	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22520002			22514014			22514008			22520004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-16			17-SL-17			17-SL-17A			17-SL-18		
Collect Date:	15-AUG-92			16-AUG-92			16-AUG-92			15-AUG-92		
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL
4-Nitroaniline	2000	U	ug/kg	2000	1900	UJ	ug/kg	1900	1900	UJ	ug/kg	1900
4,6-Dinitro-2-methylphenol	2000	U	ug/kg	2000	1900	UJ	ug/kg	1900	1900	U	ug/kg	1900
N-Nitrosodiphenylamine	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
4-Bromophenyl-phenylether	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Hexachlorobenzene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Pentachlorophenol	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1900	U	ug/kg	1900
Phenanthrene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Anthracene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Carbazole												
Di-n-butylphthalate	400	UJ	ug/kg	400	400	UJ	ug/kg	400	400	UJ	ug/kg	390
Fluoranthene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Pyrene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Butylbenzylphthalate	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
3,3-Dichlorobenzidine	810	U	ug/kg	810	800	UJ	ug/kg	800	800	UJ	ug/kg	790
Benzo (a) anthracene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Chrysene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
bis(2-Ethylhexyl) phthalate	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Di-n-octylphthalate	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Benzo (b) fluoranthene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Benzo (k) fluoranthene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Benzo (a) pyrene	400	U	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Indeno (1,2,3-cd) pyrene	400	UJ	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Dibenzo (a,h) anthracene	400	UJ	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390
Benzo (g,h,i) perylene	400	UJ	ug/kg	400	400	U	ug/kg	400	400	U	ug/kg	390

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22520003	22514015	22516003	22516004							
Site	WHITING	WHITING	WHITING	WHITING							
Locator	17-SL-19	17-SL-20	17-SL-21	17-SL-21A							
Collect Date:	15-AUG-92	16-AUG-92	16-AUG-92	16-AUG-92							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP SEMIVOLATILES 90-SOW

Phenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
bis(2-Chloroethyl) ether	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2-Chlorophenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
1,3-Dichlorobenzene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
1,4-Dichlorobenzene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
1,2-Dichlorobenzene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2-Methylphenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,2-oxybis(1-Chloropropane)	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
4-Methylphenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
N-Nitroso-di-n-propylamine	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Hexachloroethane	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Nitrobenzene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Isophorone	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2-Nitrophenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,4-Dimethylphenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
bis(2-Chloroethoxy) methane	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,4-Dichlorophenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
1,2,4-Trichlorobenzene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Naphthalene	1500	J	ug/kg	2000	81	J	ug/kg	400	620	J	ug/kg	2000	520	J	ug/kg	2300
4-Chloroaniline	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Hexachlorobutadiene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
4-Chloro-3-methylphenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2-Methylnaphthalene	4100	ug/kg	2000	400	U	ug/kg	400	1500	J	ug/kg	2000	1400	J	ug/kg	2300	
Hexachlorocyclopentadiene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,4,6-Trichlorophenol	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,4,5-Trichlorophenol	9600	U	ug/kg	9600	2000	U	ug/kg	2000	9600	U	ug/kg	9600	11000	U	ug/kg	11000
2-Chloronaphthalene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2-Nitroaniline	9600	U	ug/kg	9600	2000	U	ug/kg	2000	9600	U	ug/kg	9600	11000	U	ug/kg	11000
Dimethylphthalate	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Acenaphthylene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,6-Dinitrotoluene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
3-Nitroaniline	9600	UJ	ug/kg	9600	2000	U	ug/kg	2000	9600	U	ug/kg	9600	11000	U	ug/kg	11000
Acenaphthene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,4-Dinitropheno	9600	UJ	ug/kg	9600	2000	UJ	ug/kg	2000	9600	UJ	ug/kg	9600	11000	UJ	ug/kg	11000
4-Nitrophenol	9600	UJ	ug/kg	9600	2000	U	ug/kg	2000	9600	U	ug/kg	9600	11000	U	ug/kg	11000
Dibenzofuran	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
2,4-Dinitrotoluene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Diethylphthalate	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
4-Chlorophenyl-phenylether	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300
Fluorene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2000	2300	U	ug/kg	2300

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22520003			22514015			22516003			22516004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-19			17-SL-20			17-SL-21			17-SL-21A		
Collect Date:	15-AUG-92			16-AUG-92			16-AUG-92			16-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	9600	U	ug/kg	9600	2000	UJ	ug/kg	2000	9600	U	ug/kg	9600
4,6-Dinitro-2-methylphenol	9600	U	ug/kg	9600	2000	UJ	ug/kg	2000	9600	U	ug/kg	11000
N-Nitrosodiphenylamine	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
4-Bromophenyl-phenylether	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Hexachlorobenzene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Pentachlorophenol	9600	U	ug/kg	9600	2000	U	ug/kg	2000	9600	U	ug/kg	11000
Phenanthrene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Anthracene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Carbazole	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate	2000	U	ug/kg	2000	400	UJ	ug/kg	400	2000	U	ug/kg	2300
Fluoranthene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Pyrene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Butylbenzylphthalate	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
3,3-Dichlorobenzidine	4000	UJ	ug/kg	4000	810	UJ	ug/kg	810	4000	U	ug/kg	4600
Benzo (a) anthracene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Chrysene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
bis(2-Ethylhexyl) phthalate	750	J	ug/kg	2000	160	J	ug/kg	400	450	J	ug/kg	2300
Di-n-octylphthalate	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Benzo (b) fluoranthene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Benzo (k) fluoranthene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Benzo (a) pyrene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Indeno (1,2,3-cd) pyrene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Dibenzo (a,h) anthracene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300
Benzo (g,h,i) perylene	2000	U	ug/kg	2000	400	U	ug/kg	400	2000	U	ug/kg	2300

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22514001	22514002	22514003	22514004							
Site	WHITING	WHITING	WHITING	WHITING							
Locator	17-SL-22	17-SL-23	17-SL-24	17-SL-25							
Collect Date:	16-AUG-92	16-AUG-92	16-AUG-92	16-AUG-92							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP SEMIVOLATILES 90-SOW

Phenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
bis(2-Chloroethyl) ether	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2-Chlorophenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
1,3-Dichlorobenzene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
1,4-Dichlorobenzene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
1,2-Dichlorobenzene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2-Methylphenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,2-oxybis(1-Chloropropane)	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
4-Methylphenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
N-Nitroso-di-n-propylamine	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Hexachloroethane	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Nitrobenzene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Isophorone	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2-Nitrophenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,4-Dimethylphenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
bis(2-Chloroethoxy) methane	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,4-Dichlorophenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
1,2,4-Trichlorobenzene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Naphthalene	1200	U	ug/kg	1200	1000	J	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
4-Chloroaniline	1200	UJ	ug/kg	1200	2300	UJ	ug/kg	2300	4800	UJ	ug/kg	4800	780	UJ	ug/kg	780
Hexachlorobutadiene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
4-Chloro-3-methylphenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2-Methylnaphthalene	1200	U	ug/kg	1200	4900	ug/kg		2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Hexachlorocyclopentadiene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,4,6-Trichlorophenol	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,4,5-Trichlorophenol	5900	U	ug/kg	5900	11000	U	ug/kg	11000	23000	U	ug/kg	23000	3800	U	ug/kg	3800
2-Chloronaphthalene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2-Nitroaniline	5900	U	ug/kg	5900	11000	U	ug/kg	11000	23000	U	ug/kg	23000	3800	U	ug/kg	3800
Dimethylphthalate	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Acenaphthylene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,6-Dinitrotoluene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
3-Nitroaniline	5900	UJ	ug/kg	5900	11000	UJ	ug/kg	11000	23000	UJ	ug/kg	23000	3800	UJ	ug/kg	3800
Acenaphthene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,4-Dinitrophenol	5900	UJ	ug/kg	5900	11000	UJ	ug/kg	11000	23000	UJ	ug/kg	23000	3800	UJ	ug/kg	3800
4-Nitrophenol	5900	U	ug/kg	5900	11000	U	ug/kg	11000	23000	U	ug/kg	23000	3800	U	ug/kg	3800
Dibenzofuran	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
2,4-Dinitrotoluene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Diethylphthalate	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
4-Chlorophenyl-phenylether	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780
Fluorene	1200	U	ug/kg	1200	2300	U	ug/kg	2300	4800	U	ug/kg	4800	780	U	ug/kg	780

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number: Site Locator Collect Date:	22514001 WHITING 17-SL-22 16-AUG-92	22514002 WHITING 17-SL-23 16-AUG-92	22514003 WHITING 17-SL-24 16-AUG-92	22514004 WHITING 17-SL-25 16-AUG-92
	VALUE QUAL UNITS	VALUE QUAL UNITS	VALUE QUAL UNITS	VALUE QUAL UNITS
4-Nitroaniline	5900 UJ ug/kg	5900 11000 UJ ug/kg	11000 23000 UJ ug/kg	23000 3800 UJ ug/kg
4,6-Dinitro-2-methylphenol	5900 UJ ug/kg	5900 11000 UJ ug/kg	11000 23000 UJ ug/kg	23000 3800 UJ ug/kg
N-Nitrosodiphenylamine	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
4-Bromophenyl-phenylether	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Hexachlorobenzene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Pentachlorophenol	5900 U ug/kg	5900 11000 U ug/kg	11000 23000 U ug/kg	23000 3800 U ug/kg
Phenanthrene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Anthracene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Carbazole				
Di-n-butylphthalate	1200 UJ ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Fluoranthene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Pyrene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Butylbenzylphthalate	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
3,3-Dichlorobenzidine	2400 UJ ug/kg	2400 4600 UJ ug/kg	4600 9700 UJ ug/kg	9700 1600 UJ ug/kg
Benzo (a) anthracene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Chrysene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
bis(2-Ethylhexyl) phthalate	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Di-n-octylphthalate	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Benzo (b) fluoranthene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Benzo (k) fluoranthene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Benzo (a) pyrene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Indeno (1,2,3-cd) pyrene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Dibenza (a,h) anthracene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg
Benzo (g,h,i) perylene	1200 U ug/kg	1200 2300 U ug/kg	2300 4800 U ug/kg	4800 780 U ug/kg

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22514005	22514006	22514007	22520005							
Site	WHITING	WHITING	WHITING	WHITING							
Locator	17-SL-26	17-SL-27	17-SL-28	17-SL-29							
Collect Date:	16-AUG-92	16-AUG-92	16-AUG-92	15-AUG-92							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP SEMIVOLATILES 90-SOW

Phenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
bis(2-Chloroethyl) ether	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2-Chlorophenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
1,3-Dichlorobenzene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
1,4-Dichlorobenzene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
1,2-Dichlorobenzene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2-Methylphenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,2-oxybis(1-Chloropropane)	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
4-Methylphenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
N-Nitroso-di-n-propylamine	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Hexachloroethane	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Nitrobenzene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Isophorone	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2-Nitrophenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,4-Dimethylphenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
bis(2-Chloroethoxy) methane	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,4-Dichlorophenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
1,2,4-Trichlorobenzene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Naphthalene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
4-Chloroaniline	400	UJ	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Hexachlorobutadiene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
4-Chloro-3-methylphenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2-Methylnaphthalene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Hexachlorocyclopentadiene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,4,6-Trichlorophenol	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,4,5-Trichlorophenol	2000	U	ug/kg	2000	5800	U	ug/kg	5800	48000	UJ	ug/kg	48000	1900	U	ug/kg	1900
2-Chloronaphthalene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2-Nitroaniline	2000	U	ug/kg	2000	5800	U	ug/kg	5800	48000	UJ	ug/kg	48000	1900	U	ug/kg	1900
Dimethylphthalate	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Acenaphthylene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,6-Dinitrotoluene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
3-Nitroaniline	2000	UJ	ug/kg	2000	5800	U	ug/kg	5800	48000	UJ	ug/kg	48000	1900	U	ug/kg	1900
Acenaphthene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,4-Dinitrophenol	2000	UJ	ug/kg	2000	5800	UJ	ug/kg	5800	48000	UJ	ug/kg	48000	1900	U	ug/kg	1900
4-Nitrophenol	2000	U	ug/kg	2000	5800	U	ug/kg	5800	48000	UJ	ug/kg	48000	1900	U	ug/kg	1900
Dibenzo-furan	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
2,4-Dinitrotoluene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Diethylphthalate	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
4-Chlorophenyl-phenylether	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	U	ug/kg	390
Fluorene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900	390	UJ	ug/kg	390

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22514005			22514006			22514007			22520005		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-26			17-SL-27			17-SL-28			17-SL-29		
Collect Date:	16-AUG-92			16-AUG-92			16-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	2000	UJ	ug/kg	2000	5800	UJ	ug/kg	5800	48000	UJ	ug/kg	48000
4,6-Dinitro-2-methylphenol	2000	UJ	ug/kg	2000	5800	UJ	ug/kg	5800	48000	UJ	ug/kg	48000
N-Nitrosodiphenylamine	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
4-Bromophenyl-phenylether	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Hexachlorobenzene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Pentachlorophenol	2000	U	ug/kg	2000	5800	U	ug/kg	5800	48000	UJ	ug/kg	48000
Phenanthrene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Anthracene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Carbazole												
Di-n-butylphthalate	400	UJ	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Fluoranthene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Pyrene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Butylbenzylphthalate	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
3,3-Dichlorobenzidine	810	UJ	ug/kg	810	2400	UJ	ug/kg	2400	20000	UJ	ug/kg	20000
Benzo (a) anthracene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Chrysene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
bis(2-Ethylhexyl) phthalate	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Di-n-octylphthalate	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Benzo (b) fluoranthene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Benzo (k) fluoranthene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Benzo (a) pyrene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Indeno (1,2,3-cd) pyrene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Dibenzo (a,h) anthracene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900
Benzo (g,h,i) perylene	400	U	ug/kg	400	1200	U	ug/kg	1200	9900	UJ	ug/kg	9900

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22520006	22520007	22520008	22520009							
Site	WHITING	WHITING	WHITING	WHITING							
Locator	17-SL-30	17-SL-31	17-SL-32	17-SL-33							
Collect Date:	15-AUG-92	15-AUG-92	15-AUG-92	15-AUG-92							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP SEMIVOLATILES 90-SOW

Phenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
bis(2-Chloroethyl) ether	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2-Chlorophenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
1,3-Dichlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
1,4-Dichlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
1,2-Dichlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2-Methylphenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,2-oxybis(1-Chloropropane)	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
4-Methylphenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
N-Nitroso-di-n-propylamine	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Hexachloroethane	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Nitrobenzene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Isophorone	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2-Nitrophenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,4-Dimethylphenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
bis(2-Chloroethoxy) methane	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,4-Dichlorophenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
1,2,4-Trichlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Naphthalene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
4-Chloroaniline	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Hexachlorobutadiene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
4-Chloro-3-methylphenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2-Methylnaphthalene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Hexachlorocyclopentadiene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,4,6-Trichlorophenol	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,4,5-Trichlorophenol	1700	U	ug/kg	1700	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1800	U	ug/kg	1800
2-Chloronaphthalene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2-Nitroaniline	1700	U	ug/kg	1700	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1800	U	ug/kg	1800
Dimethylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Acenaphthylene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,6-Dinitrotoluene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
3-Nitroaniline	1700	UJ	ug/kg	1700	2000	UJ	ug/kg	2000	1900	UJ	ug/kg	1900	1800	UJ	ug/kg	1800
Acenaphthene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,4-Dinitrophenol	1700	UJ	ug/kg	1700	2000	UJ	ug/kg	2000	1900	UJ	ug/kg	1900	1800	UJ	ug/kg	1800
4-Nitrophenol	1700	U	ug/kg	1700	2000	U	ug/kg	2000	1900	U	ug/kg	1900	1800	U	ug/kg	1800
Dibenzofuran	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
2,4-Dinitrotoluene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Diethylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
4-Chlorophenyl-phenylether	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370
Fluorene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380	370	U	ug/kg	370

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22520006			22520007			22520008			22520009		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-30			17-SL-31			17-SL-32			17-SL-33		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	1700	UJ	ug/kg	1700	2000	UJ	ug/kg	2000	1900	UJ	ug/kg	1900
4,6-Dinitro-2-methylphenol	1700	U	ug/kg	1700	2000	U	ug/kg	2000	1900	U	ug/kg	1900
N-Nitrosodiphenylamine	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
4-Bromophenyl-phenylether	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Hexachlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Pentachlorophenol	1700	U	ug/kg	1700	2000	U	ug/kg	2000	1900	U	ug/kg	1900
Phenanthrene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Anthracene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Carbazole												
Di-n-butylphthalate	360	U	ug/kg	360	420	UJ	ug/kg	420	380	U	ug/kg	380
Fluoranthene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Pyrene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Butylbenzylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
3,3-Dichlorobenzidine	720	UJ	ug/kg	720	840	UJ	ug/kg	840	770	UJ	ug/kg	770
Benzo (a) anthracene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Chrysene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
bis(2-Ethylhexyl) phthalate	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Di-n-octylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Benzo (b) fluoranthene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Benzo (k) fluoranthene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Benzo (a) pyrene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Indeno (1,2,3-cd) pyrene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Dibenzo (a,h) anthracene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380
Benzo (g,h,i) perylene	360	U	ug/kg	360	420	U	ug/kg	420	380	U	ug/kg	380

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:	22520010
Site	WHITING
Locator	17-SL-34
Collect Date:	15-AUG-92

VALUE	QUAL	UNITS	DL
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CLP SEMIVOLATILES 90-SOW

Phenol	360	U	ug/kg	360
bis(2-Chloroethyl) ether	360	U	ug/kg	360
2-Chlorophenol	360	U	ug/kg	360
1,3-Dichlorobenzene	360	U	ug/kg	360
1,4-Dichlorobenzene	360	U	ug/kg	360
1,2-Dichlorobenzene	360	U	ug/kg	360
2-Methylphenol	360	U	ug/kg	360
2,2'-oxybis(1-Chloropropane)	360	U	ug/kg	360
4-Methylphenol	360	U	ug/kg	360
N-Nitroso-di-n-propylamine	360	U	ug/kg	360
Hexachloroethane	360	U	ug/kg	360
Nitrobenzene	360	U	ug/kg	360
Isophorone	360	U	ug/kg	360
2-Nitrophenol	360	U	ug/kg	360
2,4-Dimethylphenol	360	U	ug/kg	360
bis(2-Chloroethoxy) methane	360	U	ug/kg	360
2,4-Dichlorophenol	360	U	ug/kg	360
1,2,4-Trichlorobenzene	360	U	ug/kg	360
Naphthalene	360	U	ug/kg	360
4-Chloroaniline	360	U	ug/kg	360
Hexachlorobutadiene	360	U	ug/kg	360
4-Chloro-3-methylphenol	360	U	ug/kg	360
2-Methylnaphthalene	360	U	ug/kg	360
Hexachlorocyclopentadiene	360	U	ug/kg	360
2,4,6-Trichlorophenol	360	U	ug/kg	360
2,4,5-Trichlorophenol	1800	U	ug/kg	1800
2-Chloronaphthalene	360	U	ug/kg	360
2-Nitroaniline	1800	U	ug/kg	1800
Dimethylphthalate	360	U	ug/kg	360
Acenaphthylene	360	U	ug/kg	360
2,6-Dinitrotoluene	360	U	ug/kg	360
3-Nitroaniline	1800	UJ	ug/kg	1800
Acenaphthene	360	U	ug/kg	360
2,4-Dinitrophenol	1800	UJ	ug/kg	1800
4-Nitrophenol	1800	U	ug/kg	1800
Dibenzofuran	360	U	ug/kg	360
2,4-Dinitrotoluene	360	U	ug/kg	360
Diethylphthalate	360	U	ug/kg	360
4-Chlorophenyl-phenylether	360	U	ug/kg	360
Fluorene	360	U	ug/kg	360

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10626

Lab Sample Number:

22520010

Site

WHITING

Locator

17-SL-34

Collect Date:

15-AUG-92

VALUE

QUAL UNITS

DL

4-Nitroaniline	1800	UJ	ug/kg	1800
4,6-Dinitro-2-methylphenol	1800	U	ug/kg	1800
N-Nitrosodiphenylamine	360	U	ug/kg	360
4-Bromophenyl-phenylether	360	U	ug/kg	360
Hexachlorobenzene	360	U	ug/kg	360
Pentachlorophenol	1800	U	ug/kg	1800
Phenanthrene	360	U	ug/kg	360
Anthracene	360	U	ug/kg	360
Carbazole	-	-	-	-
Di-n-butylphthalate	360	U	ug/kg	360
Fluoranthene	360	U	ug/kg	360
Pyrene	360	U	ug/kg	360
Butylbenzylphthalate	360	U	ug/kg	360
3,3-Dichlorobenzidine	730	UJ	ug/kg	730
Benzo (a) anthracene	360	U	ug/kg	360
Chrysene	360	U	ug/kg	360
bis(2-Ethylhexyl) phthalate	360	U	ug/kg	360
Di-n-octylphthalate	360	U	ug/kg	360
Benzo (b) fluoranthene	360	U	ug/kg	360
Benzo (k) fluoranthene	360	U	ug/kg	360
Benzo (a) pyrene	360	U	ug/kg	360
Indeno (1,2,3-cd) pyrene	360	U	ug/kg	360
Dibenzo (a,h) anthracene	360	U	ug/kg	360
Benzo (g,h,i) perylene	360	U	ug/kg	360

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- PESTICIDES/PCBs -- REPORT NO. 10627

Lab Sample Number:	22505002			22505007			22505009			22516001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-02			17-SL-07			17-SL-09			17-SL-11		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			19-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBs 90-SOW												
alpha-BHC	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
beta-BHC	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
delta-BHC	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
gamma-BHC (Lindane)	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
Heptachlor	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
Aldrin	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
Heptachlor epoxide	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
Endosulfan I	9.4	U	ug/kg	9.4	9.6	U	ug/kg	9.6	9.4	U	ug/kg	9.4
Dieldrin	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
4,4-DDE	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
Endrin	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
Endosulfan II	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
4,4-DDD	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
Endosulfan sulfate	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
4,4-DDT	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
Methoxychlor	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
Endrin ketone	19	U	ug/kg	19	19	U	ug/kg	19	19	U	ug/kg	19
Endrin aldehyde	-	-	-	-	-	-	-	-	-	-	-	-
alpha-Chlordane	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
gamma-Chlordane	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
Toxaphene	190	U	ug/kg	190	190	U	ug/kg	190	190	U	ug/kg	190
Aroclor-1016	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
Aroclor-1221	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
Aroclor-1232	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
Aroclor-1242	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
Aroclor-1248	94	U	ug/kg	94	96	U	ug/kg	96	94	U	ug/kg	94
Aroclor-1254	190	U	ug/kg	190	190	U	ug/kg	190	190	U	ug/kg	190
Aroclor-1260	190	U	ug/kg	190	190	U	ug/kg	190	190	U	ug/kg	190

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- PESTICIDES/PCBS -- REPORT NO. 10627

Lab Sample Number:	22516002	Site	WHITING	Locator	17-SL-11A	Collect Date:	19-AUG-92	22520001	WHITING	17-SL-15	15-AUG-92	22514014	WHITING	17-SL-17	16-AUG-92	22514008	WHITING	17-SL-17A	16-AUG-92
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	CLP PESTICIDES/PCBS 90-SOW			
alpha-BHC																			
alpha-BHC	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	alpha-BHC			
beta-BHC	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	beta-BHC			
delta-BHC	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	delta-BHC			
gamma-BHC (Lindane)	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	gamma-BHC (Lindane)			
Heptachlor	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	Heptachlor			
Aldrin	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	Aldrin			
Heptachlor epoxide	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	Heptachlor epoxide			
Endosulfan I	47 U	ug/kg	47	9.1 U	ug/kg	9.1	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	9.6 U	ug/kg	9.6	Endosulfan I			
Dieldrin	93 U	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	Dieldrin			
4,4-DDE	93 U	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	4,4-DDE			
Endrin	93 U	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	Endrin			
Endosulfan II	93 U	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	Endosulfan II			
4,4-DDD	93 U	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	4,4-DDD			
Endosulfan sulfate	93 U	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	Endosulfan sulfate			
4,4-DDT	93 UJ	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	4,4-DDT			
Methoxychlor	470 UJ	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	Methoxychlor			
Endrin ketone	93 U	ug/kg	93	18 U	ug/kg	18	19 U	ug/kg	19	19 U	ug/kg	19	19 U	ug/kg	19	Endrin ketone			
Endrin aldehyde	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Endrin aldehyde			
alpha-Chlordane	470 U	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	alpha-Chlordane			
gamma-Chlordane	470 U	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	gamma-Chlordane			
Toxaphene	930 U	ug/kg	930	180 U	ug/kg	180	190 U	ug/kg	190	190 U	ug/kg	190	190 U	ug/kg	190	Toxaphene			
Aroclor-1016	470 U	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	Aroclor-1016			
Aroclor-1221	470 U	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	Aroclor-1221			
Aroclor-1232	470 U	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	Aroclor-1232			
Aroclor-1242	470 U	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	Aroclor-1242			
Aroclor-1248	470 U	ug/kg	470	91 U	ug/kg	91	96 U	ug/kg	96	96 U	ug/kg	96	96 U	ug/kg	96	Aroclor-1248			
Aroclor-1254	930 U	ug/kg	930	180 U	ug/kg	180	190 U	ug/kg	190	190 U	ug/kg	190	190 U	ug/kg	190	Aroclor-1254			
Aroclor-1260	930 U	ug/kg	930	180 U	ug/kg	180	190 U	ug/kg	190	190 U	ug/kg	190	190 U	ug/kg	190	Aroclor-1260			

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- PESTICIDES/PCBS -- REPORT NO. 10627

Lab Sample Number:	22516003			22516004			22514004					
Site	WHITING			WHITING			WHITING					
Locator	17-SL-21			17-SL-21A			17-SL-25					
Collect Date:	19-AUG-92			19-AUG-92			16-AUG-92					
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE			
CLP PESTICIDES/PCBS 90-SOW												
alpha-BHC	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
beta-BHC	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
delta-BHC	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
gamma-BHC (Lindane)	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
Heptachlor	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
Aldrin	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
Heptachlor epoxide	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
Endosulfan I	19	U	ug/kg	19	19	U	ug/kg	19	9.4	U	ug/kg	9.4
Dieldrin	39	U	ug/kg	39	39	U	ug/kg	39	19	U	ug/kg	19
4,4-DDE	39	U	ug/kg	39	39	U	ug/kg	39	19	U	ug/kg	19
Endrin	39	U	ug/kg	39	39	U	ug/kg	39	19	U	ug/kg	19
Endosulfan II	39	U	ug/kg	39	39	U	ug/kg	39	19	U	ug/kg	19
4,4-DDD	39	U	ug/kg	39	39	U	ug/kg	39	19	U	ug/kg	19
Endosulfan sulfate	39	U	ug/kg	39	39	U	ug/kg	39	19	U	ug/kg	19
4,4-DDT	39	UJ	ug/kg	39	39	UJ	ug/kg	39	19	U	ug/kg	19
Methoxychlor	190	UJ	ug/kg	190	190	UJ	ug/kg	190	94	U	ug/kg	94
Endrin ketone	39	U	ug/kg	39	39	U	ug/kg	39	19	U	ug/kg	19
Endrin aldehyde												
alpha-Chlordane	190	U	ug/kg	190	190	U	ug/kg	190	94	U	ug/kg	94
gamma-Chlordane	190	U	ug/kg	190	190	U	ug/kg	190	94	U	ug/kg	94
Toxaphene	390	U	ug/kg	390	390	U	ug/kg	390	190	U	ug/kg	190
Aroclor-1016	190	U	ug/kg	190	190	U	ug/kg	190	94	U	ug/kg	94
Aroclor-1221	190	U	ug/kg	190	190	U	ug/kg	190	94	U	ug/kg	94
Aroclor-1232	190	U	ug/kg	190	190	U	ug/kg	190	94	U	ug/kg	94
Aroclor-1242	190	U	ug/kg	190	190	U	ug/kg	190	94	U	ug/kg	94
Aroclor-1248	190	U	ug/kg	190	190	U	ug/kg	190	94	U	ug/kg	94
Aroclor-1254	390	U	ug/kg	390	390	U	ug/kg	390	190	U	ug/kg	190
Aroclor-1260	390	U	ug/kg	390	390	U	ug/kg	390	190	U	ug/kg	190

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING, -- SITE 17
 SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22505001			22505002			22505003			22505004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-01			17-SL-02			17-SL-03			17-SL-04		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE												
Aluminum	9610	mg/kg	40		5950	mg/kg	40		5970	mg/kg	40	
Antimony	3.3 J	mg/kg	12		2.9 U	mg/kg	12		3.1 U	mg/kg	12	
Arsenic	1.3 J	mg/kg	2		.72	mg/kg	2		.53 J	mg/kg	2	
Barium	11.8 J	mg/kg	40		9.1 J	mg/kg	40		11 J	mg/kg	40	
Beryllium	.09 J	mg/kg	1		.07 J	mg/kg	1		.06 J	mg/kg	1	
Cadmium	1.8	mg/kg	1		1.6	mg/kg	1		1.7	mg/kg	1	
Calcium	279 J	mg/kg	1000		106 J	mg/kg	1000		94.9 J	mg/kg	1000	
Chromium	17.4	mg/kg	2		9.8	mg/kg	2		15.1	mg/kg	2	
Cobalt	2.4 J	mg/kg	10		2 J	mg/kg	10		2 J	mg/kg	10	
Copper	6.4 J	mg/kg	5		9.8	mg/kg	5		8.9	mg/kg	5	
Iron	4920	mg/kg	20		3970	mg/kg	20		3120	mg/kg	20	
Lead	6.3	mg/kg	1		54.8	mg/kg	1		18.2	mg/kg	1	
Magnesium	178 J	mg/kg	1000		114 J	mg/kg	1000		124 J	mg/kg	1000	
Manganese	198	mg/kg	3		34.4	mg/kg	3		17.1	mg/kg	3	
Mercury	.08 U	mg/kg	.1		.06 U	mg/kg	.1		.08 U	mg/kg	.1	
Nickel	4 J	mg/kg	8		5.2 J	mg/kg	8		2.8 J	mg/kg	8	
Potassium	140 U	mg/kg	1000		252 J	mg/kg	1000		157 J	mg/kg	1000	
Selenium	.49 U	mg/kg	1		.49 U	mg/kg	1		.52 U	mg/kg	1	
Silver	.35 U	mg/kg	2		.35 U	mg/kg	2		.37 U	mg/kg	2	
Sodium	204 J	mg/kg	1000		245 J	mg/kg	1000		217 J	mg/kg	1000	
Thallium	.37 U	mg/kg	2		.37 U	mg/kg	2		.4 U	mg/kg	2	
Vanadium	13.7	mg/kg	10		7.9 J	mg/kg	10		8 J	mg/kg	10	
Zinc	13.4 J	mg/kg	4		22.2	mg/kg	4		21.6	mg/kg	4	
Cyanide	.26 U	mg/kg	1		.26 U	mg/kg	1		.28 U	mg/kg	1	

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

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NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22505005	22505006	22505007	22505008								
Site	WHITING	WHITING	WHITING	WHITING								
Locator	17-SL-05	17-SL-06	17-SL-07	17-SL-08								
Collect Date:	15-AUG-92	15-AUG-92	15-AUG-92	15-AUG-92								
	VALUE	QUAL UNITS	DL	VALUE								
CLP METALS AND CYANIDE												
Aluminum	4500	mg/kg	40	7560	mg/kg	40	29700	mg/kg	40	6380	mg/kg	40
Antimony	.3 U	mg/kg	12	2.7 U	mg/kg	12	3 U	mg/kg	12	3.2 U	mg/kg	12
Arsenic	.29 J	mg/kg	2	.55 J	mg/kg	2	4.6	mg/kg	2	1.6 J	mg/kg	2
Barium	8.5 J	mg/kg	40	11.1 J	mg/kg	40	6.8 J	mg/kg	40	3.6 J	mg/kg	40
Beryllium	.06 U	mg/kg	1	.05 U	mg/kg	1	.16 J	mg/kg	1	.06 U	mg/kg	1
Cadmium	.76 J	mg/kg	1	6.8	mg/kg	1	.66 U	mg/kg	1	.7 U	mg/kg	1
Calcium	129 J	mg/kg	1000	208 J	mg/kg	1000	97.5 J	mg/kg	1000	111 J	mg/kg	1000
Chromium	4.1	mg/kg	2	19.2	mg/kg	2	26.9	mg/kg	2	6.4	mg/kg	2
Cobalt	1.5 J	mg/kg	10	1.8 J	mg/kg	10	2 J	mg/kg	10	1.1 J	mg/kg	10
Copper	5.1 J	mg/kg	5	44.2	mg/kg	5	9.8	mg/kg	5	6.1 J	mg/kg	5
Iron	2730	mg/kg	20	3430	mg/kg	20	23800	mg/kg	20	4550	mg/kg	20
Lead	7.7	mg/kg	1	70.1	mg/kg	1	6.8	mg/kg	1	4	mg/kg	1
Magnesium	93.3 J	mg/kg	1000	172 J	mg/kg	1000	106 J	mg/kg	1000	59.1 J	mg/kg	1000
Manganese	19.6	mg/kg	3	31.8	mg/kg	3	13.9	mg/kg	3	5.1	mg/kg	3
Mercury	.1 U	mg/kg	.1	.07 U	mg/kg	.1	.1 U	mg/kg	.1	.1 U	mg/kg	.1
Nickel	3.2 J	mg/kg	8	5.7 J	mg/kg	8	4.7 J	mg/kg	8	3.2 J	mg/kg	8
Potassium	147 U	mg/kg	1000	288 J	mg/kg	1000	145 U	mg/kg	1000	154 U	mg/kg	1000
Selenium	.51 U	mg/kg	1	.45 U	mg/kg	1	.5 U	mg/kg	1	.53 U	mg/kg	1
Silver	.36 U	mg/kg	2	.32 U	mg/kg	2	.36 U	mg/kg	2	.38 U	mg/kg	2
Sodium	209 J	mg/kg	1000	186 J	mg/kg	1000	279 J	mg/kg	1000	172 J	mg/kg	1000
Thallium	.39 U	mg/kg	2	.34 U	mg/kg	2	.38 U	mg/kg	2	.41 U	mg/kg	2
Vanadium	6.4 J	mg/kg	10	9.5 J	mg/kg	10	71.3	mg/kg	10	12.8	mg/kg	10
Zinc	7.3	mg/kg	4	69.1	mg/kg	4	11	mg/kg	4	8.7 J	mg/kg	4
Cyanide	.26 U	mg/kg	1	.24 U	mg/kg	1	.27 U	mg/kg	1	.28 U	mg/kg	1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22505009			22505010			22516001			22516002		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-09			17-SL-10			17-SL-11			17-SL-11A		
Collect Date:	15-AUG-92			15-AUG-92			16-AUG-92			16-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE												
Aluminum	5420	mg/kg	40		29900	mg/kg	40		7190	mg/kg	40	
Antimony	2.8 U	mg/kg	12		2.9 U	mg/kg	12		3 U	mg/kg	12	
Arsenic	.81 J	mg/kg	2		3.1	mg/kg	2		1.5 UJ	mg/kg	2	
Barium	8.3 J	mg/kg	40		12 J	mg/kg	40		24 J	mg/kg	40	
Beryllium	.06 U	mg/kg	1		.07 J	mg/kg	1		.06 U	mg/kg	1	
Cadmium	1.2	mg/kg	1		.63 U	mg/kg	1		.67 UJ	mg/kg	1	
Calcium	97 J	mg/kg	1000		199 J	mg/kg	1000		312 UJ	mg/kg	1000	
Chromium	4	mg/kg	2		24.7	mg/kg	2		12 J	mg/kg	2	
Cobalt	1.3 J	mg/kg	10		.85 J	mg/kg	10		2 UJ	mg/kg	10	
Copper	2.4 J	mg/kg	5		6.4 J	mg/kg	5		24.3 J	mg/kg	5	
Iron	3020	mg/kg	20		12300	mg/kg	20		10100	mg/kg	20	
Lead	3	mg/kg	1		4.3	mg/kg	1		156	mg/kg	1	
Magnesium	106 J	mg/kg	1000		143 J	mg/kg	1000		180 J	mg/kg	1000	
Manganese	32.4	mg/kg	3		18	mg/kg	3		56.1 J	mg/kg	3	
Mercury	.07 U	mg/kg	.1		.09 U	mg/kg	.1		.08 UJ	mg/kg	.1	
Nickel	3.1 J	mg/kg	8		4.6 J	mg/kg	8		8.5 J	mg/kg	8	
Potassium	137 U	mg/kg	1000		139 U	mg/kg	1000		264 J	mg/kg	1000	
Selenium	.47 U	mg/kg	1		.48 U	mg/kg	1		.51 U	mg/kg	1	
Silver	.34 U	mg/kg	2		.34 U	mg/kg	2		.36 U	mg/kg	2	
Sodium	186 J	mg/kg	1000		184 J	mg/kg	1000		211 UJ	mg/kg	1000	
Thallium	.36 U	mg/kg	2		.37 U	mg/kg	2		.39 U	mg/kg	2	
Vanadium	7.6 J	mg/kg	10		37	mg/kg	10		9.2 J	mg/kg	10	
Zinc	7.2 J	mg/kg	4		8.9 J	mg/kg	4		74.1 J	mg/kg	4	
Cyanide	.25 U	mg/kg	1		.26 U	mg/kg	1		.27 U	mg/kg	1	

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22514011	Site	WHITING	Locator	17-SL-12	Collect Date:	16-AUG-92	22514012	WHITING	22514013	WHITING	22520001	WHITING	
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL
CLP METALS AND CYANIDE														
Aluminum	5410	mg/kg	40	7340	mg/kg	40	5750	mg/kg	40	16500	mg/kg	40		
Antimony	2.9 U	mg/kg	12	3 U	mg/kg	12	3.1 U	mg/kg	12	2.8 U	mg/kg	12		
Arsenic	.84 J	mg/kg	2	1.2 J	mg/kg	2	1.1 J	mg/kg	2	3.4	mg/kg	2		
Barium	26.9 J	mg/kg	40	20.7 J	mg/kg	40	11.8 J	mg/kg	40	17 J	mg/kg	40		
Beryllium	.06 UJ	mg/kg	1	.06 UJ	mg/kg	1	.06 UJ	mg/kg	1	.16 J	mg/kg	1		
Cadmium	.65 U	mg/kg	1	1.1 J	mg/kg	1	.68 U	mg/kg	1	.87 J	mg/kg	1		
Calcium	136 J	mg/kg	1000	415 J	mg/kg	1000	107 J	mg/kg	1000	150 J	mg/kg	1000		
Chromium	6	mg/kg	2	12.9	mg/kg	2	5.4	mg/kg	2	16.5	mg/kg	2		
Cobalt	.37 U	mg/kg	10	1 J	mg/kg	10	.38 U	mg/kg	10	1.3 J	mg/kg	10		
Copper	9.2	mg/kg	5	15.9	mg/kg	5	22.3	mg/kg	5	7.3	mg/kg	5		
Iron	2870	mg/kg	20	4640	mg/kg	20	2550	mg/kg	20	10100	mg/kg	20		
Lead	36.1	mg/kg	1	95.4	mg/kg	1	15.7	mg/kg	1	9	mg/kg	1		
Magnesium	80.8 J	mg/kg	1000	148 J	mg/kg	1000	105 J	mg/kg	1000	183 J	mg/kg	1000		
Manganese	11	mg/kg	3	50.4	mg/kg	3	10	mg/kg	3	26.1	mg/kg	3		
Mercury	.04 U	mg/kg	.1	.04 U	mg/kg	.1	.04 U	mg/kg	.1	.08 U	mg/kg	.1		
Nickel	2.5 U	mg/kg	8	2.6 U	mg/kg	8	2.6 U	mg/kg	8	2.4 U	mg/kg	8		
Potassium	185 J	mg/kg	1000	384 J	mg/kg	1000	197 J	mg/kg	1000	248 J	mg/kg	1000		
Selenium	.5 U	mg/kg	1	.51 U	mg/kg	1	.52 U	mg/kg	1	.48 U	mg/kg	1		
Silver	.35 U	mg/kg	2	.47 J	mg/kg	2	.44 J	mg/kg	2	.34 U	mg/kg	2		
Sodium	157 J	mg/kg	1000	167 J	mg/kg	1000	199 J	mg/kg	1000	209 J	mg/kg	1000		
Thallium	.38 U	mg/kg	2	.39 U	mg/kg	2	.39 U	mg/kg	2	.36 U	mg/kg	2		
Vanadium	8.4 J	mg/kg	10	10 J	mg/kg	10	8.4 J	mg/kg	10	25	mg/kg	10		
Zinc	18.8	mg/kg	4	56.4	mg/kg	4	20.7	mg/kg	4	10.2	mg/kg	4		
Cyanide	.26 U	mg/kg	1	.27 U	mg/kg	1	.27 U	mg/kg	1	.25 U	mg/kg	1		

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22520002	22514014	22514008	22520004							
Site	WHITING	WHITING	WHITING	WHITING							
Locator	17-SL-16	17-SL-17	17-SL-17A	17-SL-18							
Collect Date:	15-AUG-92	16-AUG-92	16-AUG-92	15-AUG-92							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP METALS AND CYANIDE

Aluminum	8400	mg/kg	40	12000	mg/kg	40	12700	mg/kg	40	11700	mg/kg	40
Antimony	3 U	mg/kg	12	3 U	mg/kg	12	3 U	mg/kg	12	3 U	mg/kg	12
Arsenic	1 J	mg/kg	2	1.6 J	mg/kg	2	2.8	mg/kg	2	1.8 J	mg/kg	2
Barium	145	mg/kg	40	9.6 J	mg/kg	40	12.2 J	mg/kg	40	17 J	mg/kg	40
Beryllium	.08 J	mg/kg	1	.08 J	mg/kg	1	.06 U	mg/kg	1	.12 J	mg/kg	1
Cadmium	13.9	mg/kg	1	.66 U	mg/kg	1	.66 U	mg/kg	1	.66 U	mg/kg	1
Calcium	357 J	mg/kg	1000	197 J	mg/kg	1000	229 J	mg/kg	1000	123 J	mg/kg	1000
Chromium	64.7	mg/kg	2	10.1	mg/kg	2	12.1	mg/kg	2	8.9	mg/kg	2
Cobalt	.98 J	mg/kg	10	.86 J	mg/kg	10	1.1 J	mg/kg	10	1.1 J	mg/kg	10
Copper	128	mg/kg	5	10.3	mg/kg	5	19.4	mg/kg	5	10	mg/kg	5
Iron	4270	mg/kg	20	5900	mg/kg	20	6040	mg/kg	20	5780	mg/kg	2
Lead	207	mg/kg	1	56.9	mg/kg	1	66.6	mg/kg	1	9.7	mg/kg	1
Magnesium	358 J	mg/kg	1000	121 J	mg/kg	1000	162 J	mg/kg	1000	175 J	mg/kg	1000
Manganese	63.7	mg/kg	3	18.3	mg/kg	3	22.4	mg/kg	3	20	mg/kg	3
Mercury	.09 U	mg/kg	.1	.04 U	mg/kg	.1	.04 U	mg/kg	.1	.07 U	mg/kg	.1
Nickel	2.6 U	mg/kg	8	2.6 U	mg/kg	8	2.7 J	mg/kg	8	5.2 J	mg/kg	8
Potassium	248 J	mg/kg	1000	397 J	mg/kg	1000	403 J	mg/kg	1000	196 J	mg/kg	1000
Selenium	.5 U	mg/kg	1	.5 U	mg/kg	1	.5 U	mg/kg	1	.51 U	mg/kg	1
Silver	.36 U	mg/kg	2	.36 U	mg/kg	2	.61 J	mg/kg	2	.36 U	mg/kg	2
Sodium	198 J	mg/kg	1000	257 J	mg/kg	1000	183 J	mg/kg	1000	178 J	mg/kg	1000
Thallium	.38 U	mg/kg	2	.38 U	mg/kg	2	.38 U	mg/kg	2	.38 U	mg/kg	2
Vanadium	10.3 J	mg/kg	10	16.1	mg/kg	10	17.5	mg/kg	10	15.2	mg/kg	10
Zinc	179	mg/kg	4	13.8	mg/kg	4	23.4	mg/kg	4	11.1	mg/kg	4
Cyanide	.27 U	mg/kg	1	.27 U	mg/kg	1	.27 U	mg/kg	1	.27 U	mg/kg	1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22520003			22514015			22516003			22516004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-19			17-SL-20			17-SL-21			17-SL-21A		
Collect Date:	15-AUG-92			16-AUG-92			16-AUG-92			16-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE												
Aluminum	27900	mg/kg		40	23800	mg/kg		40	21400	mg/kg		40
Antimony	.3 U	mg/kg		12	.3 U	mg/kg		12	5.1 J	mg/kg		12
Arsenic	5.9	mg/kg		2	2.2 J	mg/kg		2	2.8	mg/kg		2
Barium	22.6 J	mg/kg		40	49.5	mg/kg		40	91.2	mg/kg		40
Beryllium	.22 J	mg/kg		1	.09 J	mg/kg		1	.21 J	mg/kg		1
Cadmium	.65 U	mg/kg		1	8.4	mg/kg		1	22.4 J	mg/kg		1
Calcium	262 J	mg/kg	1000	253 J	mg/kg	1000	359 UJ	mg/kg	1000	328 UJ	mg/kg	1000
Chromium	21.6	mg/kg		2	40	mg/kg		2	58.1 J	mg/kg		2
Cobalt	1.4 J	mg/kg		10	1.5 J	mg/kg		10	3.6 UJ	mg/kg		10
Copper	18.1	mg/kg		5	124	mg/kg		5	75.6 J	mg/kg		5
Iron	13500	mg/kg		20	11500	mg/kg		20	11900	mg/kg		20
Lead	64.7	mg/kg		1	79.9	mg/kg		1	80.8	mg/kg		1
Magnesium	238 J	mg/kg	1000	267 J	mg/kg	1000	484 J	mg/kg	1000	520 J	mg/kg	1000
Manganese	30	mg/kg		3	42.5	mg/kg		3	93.3	mg/kg		3
Mercury	.07 U	mg/kg		.1	.04 U	mg/kg		.1	.15 UJ	mg/kg		.1
Nickel	3.5 J	mg/kg		8	3.2 J	mg/kg		8	8.8 J	mg/kg		8
Potassium	875 J	mg/kg	1000	460 J	mg/kg	1000	805 J	mg/kg	1000	816 J	mg/kg	1000
Selenium	.5 U	mg/kg		1	.5 U	mg/kg		1	.51 UJ	mg/kg		1
Silver	.36 U	mg/kg		2	.5 J	mg/kg		2	.36 U	mg/kg		2
Sodium	193 J	mg/kg	1000	157 J	mg/kg	1000	209 UJ	mg/kg	1000	187 UJ	mg/kg	1000
Thallium	.38 U	mg/kg		2	.38 U	mg/kg		2	.39 U	mg/kg		2
Vanadium	37.8	mg/kg		10	30.8	mg/kg		10	30.7	mg/kg		10
Zinc	21.9	mg/kg		4	73	mg/kg		4	131 J	mg/kg		4
Cyanide	.26 U	mg/kg		1	.26 U	mg/kg		1	.27 U	mg/kg		1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22514001		22514002		22514003		22514004	
Site	WHITING		WHITING		WHITING		WHITING	
Locator	17-SL-22		17-SL-23		17-SL-24		17-SL-25	
Collect Date:	16-AUG-92		16-AUG-92		16-AUG-92		16-AUG-92	
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS
CLP METALS AND CYANIDE								
Aluminum	19200	mg/kg	40	17200	mg/kg	40	20900	mg/kg
Antimony	2.9 U	mg/kg	12	2.9 U	mg/kg	12	3 U	mg/kg
Arsenic	3.7	mg/kg	2	2.1 J	mg/kg	2	3.8	mg/kg
Barium	37.9 J	mg/kg	40	34.8 J	mg/kg	40	46.7 J	mg/kg
Beryllium	.15 J	mg/kg	1	.06 J	mg/kg	1	.16 J	mg/kg
Cadmium	.64 U	mg/kg	1	.64 U	mg/kg	1	2.8	mg/kg
Calcium	270 J	mg/kg	1000	333 J	mg/kg	1000	518 J	mg/kg
Chromium	18.5	mg/kg	2	18.7	mg/kg	2	30.3	mg/kg
Cobalt	1.8 J	mg/kg	10	1.8 J	mg/kg	10	2.1 J	mg/kg
Copper	18.2	mg/kg	5	218	mg/kg	5	14.1	mg/kg
Iron	11700	mg/kg	20	7520	mg/kg	20	11200	mg/kg
Lead	31.7	mg/kg	1	87.2	mg/kg	1	48.4	mg/kg
Magnesium	256 J	mg/kg	1000	378 J	mg/kg	1000	461 J	mg/kg
Manganese	94.4	mg/kg	3	144	mg/kg	3	95.4	mg/kg
Mercury	.04 U	mg/kg	.1	.04 U	mg/kg	.1	.04 U	mg/kg
Nickel	3.1 J	mg/kg	8	2.5 U	mg/kg	8	4.9 J	mg/kg
Potassium	1090 J	mg/kg	1000	1350	mg/kg	1000	641 J	mg/kg
Selenium	.49 U	mg/kg	1	.49 U	mg/kg	1	.5 U	mg/kg
Silver	.35 U	mg/kg	2	.35 U	mg/kg	2	.36 U	mg/kg
Sodium	162 J	mg/kg	1000	181 J	mg/kg	1000	167 J	mg/kg
Thallium	.37 U	mg/kg	2	.37 U	mg/kg	2	.38 U	mg/kg
Vanadium	31.7	mg/kg	10	20.1	mg/kg	10	30.9	mg/kg
Zinc	25.1	mg/kg	4	35.5	mg/kg	4	52.8	mg/kg
Cyanide	.26 U	mg/kg	1	.26 U	mg/kg	1	.26 U	mg/kg

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22514005		22514006		22514007		22520005	
Site	WHITING		WHITING		WHITING		WHITING	
Locator	17-SL-26		17-SL-27		17-SL-28		17-SL-29	
Collect Date:	16-AUG-92		16-AUG-92		16-AUG-92		15-AUG-92	
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS
CLP METALS AND CYANIDE								
Aluminum	12700	mg/kg	40	9570	mg/kg	40	14200	mg/kg
Antimony	2.9 U	mg/kg	12	3.1 U	mg/kg	12	2.9 U	mg/kg
Arsenic	2.6	mg/kg	2	2.3 J	mg/kg	2	2.4 J	mg/kg
Barium	14.8 J	mg/kg	40	95.2	mg/kg	40	53.2	mg/kg
Beryllium	.07 J	mg/kg	1	.12 J	mg/kg	1	.07 J	mg/kg
Cadmium	.64 U	mg/kg	1	1.8	mg/kg	1	.69 U	mg/kg
Calcium	780 J	mg/kg	1000	196 J	mg/kg	1000	210 J	mg/kg
Chromium	13.2	mg/kg	2	15.8	mg/kg	2	16.3	mg/kg
Cobalt	1.1 J	mg/kg	10	.72 J	mg/kg	10	1.1 J	mg/kg
Copper	24.5	mg/kg	5	22.9	mg/kg	5	27.1	mg/kg
Iron	7030	mg/kg	20	4880	mg/kg	20	7710	mg/kg
Lead	26.5	mg/kg	1	79.6	mg/kg	1	35.9	mg/kg
Magnesium	159 J	mg/kg	1000	128 J	mg/kg	1000	167 J	mg/kg
Manganese	60.7	mg/kg	3	21.5	mg/kg	3	38.9	mg/kg
Mercury	.04 U	mg/kg	.1	.05 U	mg/kg	.1	.04 U	mg/kg
Nickel	3.3 J	mg/kg	8	2.7 U	mg/kg	8	2.7 U	mg/kg
Potassium	564 J	mg/kg	1000	331 J	mg/kg	1000	616 J	mg/kg
Selenium	.49 U	mg/kg	1	.52 U	mg/kg	1	.52 U	mg/kg
Silver	.35 U	mg/kg	2	.37 U	mg/kg	2	.37 U	mg/kg
Sodium	193 J	mg/kg	1000	271 J	mg/kg	1000	277 J	mg/kg
Thallium	.37 U	mg/kg	2	.39 U	mg/kg	2	.4 U	mg/kg
Vanadium	19.3	mg/kg	10	13.8	mg/kg	10	20.4	mg/kg
Zinc	41.9	mg/kg	4	48.3	mg/kg	4	49.8	mg/kg
Cyanide	.26 U	mg/kg	1	.27 U	mg/kg	1	.27 U	mg/kg

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number:	22520006			22520007			22520008			22520009		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-30			17-SL-31			17-SL-32			17-SL-33		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			15-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE												
Aluminum	20000	mg/kg		40	7130	mg/kg		40	8510	mg/kg		40
Antimony	2.7 U	mg/kg		12	10.3 J	mg/kg		12	2.8 U	mg/kg		12
Arsenic	3.1	mg/kg		2	1.1 J	mg/kg		2	2 J	mg/kg		2
Barium	8.3 J	mg/kg		40	26.3 J	mg/kg		40	19.9 J	mg/kg		40
Beryllium	.16 J	mg/kg		1	.08 J	mg/kg		1	.06 U	mg/kg		.21 J
Cadmium	.59 U	mg/kg		1	1.8	mg/kg		1	.62 U	mg/kg		.61 U
Calcium	151 J	mg/kg	1000		280 J	mg/kg	1000		340 J	mg/kg	1000	
Chromium	15	mg/kg		2	15.7	mg/kg		2	12.6	mg/kg		2
Cobalt	1.3 J	mg/kg		10	.67 J	mg/kg		10	.59 J	mg/kg		1.3 J
Copper	5.1 J	mg/kg		5	14.5	mg/kg		5	8.7	mg/kg		11.9
Iron	10900	mg/kg		20	3900	mg/kg		20	4930	mg/kg		20
Lead	8.6	mg/kg		1	98	mg/kg		1	25.9	mg/kg		59.6
Magnesium	97.4 J	mg/kg	1000		95.1 J	mg/kg	1000		123 J	mg/kg	1000	
Manganese	27.3	mg/kg		3	17.9	mg/kg		3	35.7	mg/kg		80.1
Mercury	.08 U	mg/kg		.1	.08 U	mg/kg		.1	.08 U	mg/kg		.07 U
Nickel	2.3 U	mg/kg		8	2.8 U	mg/kg		8	2.4 U	mg/kg		4.6 J
Potassium	184 J	mg/kg	1000		155 U	mg/kg	1000		155 J	mg/kg	1000	
Selenium	.45 U	mg/kg		1	.54 U	mg/kg		1	.47 U	mg/kg		.46 U
Silver	.32 U	mg/kg		2	.38 U	mg/kg		2	.34 U	mg/kg		.33 U
Sodium	186 J	mg/kg	1000		206 J	mg/kg	1000		133 J	mg/kg	1000	
Thallium	.34 U	mg/kg		2	.41 U	mg/kg		2	.36 U	mg/kg		.35 U
Vanadium	33	mg/kg		10	10.8 J	mg/kg		10	14.1	mg/kg		39.4
Zinc	11.1	mg/kg		4	43	mg/kg		4	20.5	mg/kg		19.7
Cyanide	.24 U	mg/kg		1	.28 U	mg/kg		1	.25 U	mg/kg		.25 U

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NAS WHITING FIELD -- SITE 17
 SURFACE SOIL -- INORGANICS -- REPORT NO. 10628

Lab Sample Number: 22520010
 Site WHITING
 Locator 17-SL-34
 Collect Date: 15-AUG-92

VALUE QUAU UNITS DL

CLP METALS AND CYANIDE

Aluminum	17700	mg/kg	40
Antimony	2.7 U	mg/kg	12
Arsenic	1.8 J	mg/kg	2
Barium	14.5 J	mg/kg	40
Beryllium	.19 J	mg/kg	1
Cadmium	.6 U	mg/kg	1
Calcium	411 J	mg/kg	1000
Chromium	12.4	mg/kg	2
Cobalt	1.5 J	mg/kg	10
Copper	7	mg/kg	5
Iron	9180	mg/kg	20
Lead	8.7	mg/kg	1
Magnesium	140 J	mg/kg	1000
Manganese	187	mg/kg	3
Mercury	.08 U	mg/kg	.1
Nickel	2.9 J	mg/kg	8
Potassium	131 U	mg/kg	1000
Selenium	.46 U	mg/kg	1
Silver	.33 U	mg/kg	2
Sodium	151 J	mg/kg	1000
Thallium	.35 U	mg/kg	2
Vanadium	24.8	mg/kg	10
Zinc	10.1	mg/kg	4
Cyanide	.24 U	mg/kg	1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

ARO1 - Trend Report
SURFACE SOIL TCLP -- VOLATILES -- REPORT NO. 10629

Lab Sample Number:	22505002TC			22505007TC			22505009TC			22516001TC		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17-SL-02TCLP			17-SL-07TCLP			17-SL-09TCLP			17-SL-11TCLP		
Collect Date:	15-AUG-92			15-AUG-92			15-AUG-92			16-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Vinyl chloride	50	U	ug/l	50	50	U	ug/l	50	50	U	ug/l	50
1,1-Dichloroethene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Chloroform	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
1,2-Dichloroethane	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Butanone	50	U	ug/l	50	50	U	ug/l	50	50	U	ug/l	50
Carbon tetrachloride	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Trichloroethene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Benzene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Tetrachloroethene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Chlorobenzene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

ARO1 - Trend Report
SURFACE SOIL TCLP -- VOLATILES -- REPORT NO. 10629

Lab Sample Number: Site Locator Collect Date:	22520001TC WHITING 17-SL-15TCLP 15-AUG-92			22514014TC WHITING 17-SL-17TCLP 16-AUG-92			22516003TC WHITING 17-SL-21TCLP 16-AUG-92			22514004TC WHITING 17-SL-25TCLP 16-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Vinyl chloride	50	U	ug/l	50	50	U	ug/l	50	50	U	ug/l	50
1,1-Dichloroethene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Chloroform	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
1,2-Dichloroethane	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Butanone	50	U	ug/l	50	50	U	ug/l	50	50	U	ug/l	50
Carbon tetrachloride	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Trichloroethene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Benzene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Tetrachloroethene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Chlorobenzene	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

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NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- VOLATILES -- REPORT NO. 10630

Lab Sample Number:	34925003RE			34925004RE			34925005			34925006		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB1-5-7RE			17SB1-15-17RE			17SB2-5-7			17SB2-10-12		
Collect Date:	19-JAN-93			19-JAN-93			19-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Bromomethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Vinyl chloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Methylene chloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Acetone	11	J	ug/kg	11	29	J	ug/kg	11	47	ug/kg	12	18
Carbon disulfide	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1-Dichloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1-Dichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethene (total)	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chloroform	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethane	11	UJ	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12
2-Butanone	11	UJ	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12
1,1,1-Trichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Carbon tetrachloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Bromodichloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloropropane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
cis-1,3-Dichloropropene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Trichloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Dibromochloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2-Trichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Benzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
trans-1,3-Dichloropropene	11	UJ	ug/kg	11	11	UJ	ug/kg	11	12	U	ug/kg	12
Bromoform	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
4-Methyl-2-pentanone	11	UJ	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12
2-Hexanone	11	UJ	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12
Tetrachloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Toluene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2,2-Tetrachloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chlorobenzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Ethylbenzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Styrene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Xylenes (total)	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- VOLATILES -- REPORT NO. 10630

Lab Sample Number:	34823005			34823003			34823004			34926001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB3-10-12			17SB4-5-7			17SB4-10-12			17SB5-5-7		
Collect Date:	07-JAN-93			07-JAN-93			07-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	11	UJ	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12
Bromomethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Vinyl chloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Methylene chloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Acetone	54	UJ	ug/kg	11	100	UJ	ug/kg	11	97	UJ	ug/kg	12
Carbon disulfide	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1-Dichloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1-Dichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethene (total)	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chloroform	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
2-Butanone	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1,1-Trichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Carbon tetrachloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Bromodichloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloropropane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
cis-1,3-Dichloropropene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Trichloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Dibromochloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2-Trichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Benzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
trans-1,3-Dichloropropene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Bromoform	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
4-Methyl-2-pentanone	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
2-Hexanone	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Tetrachloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Toluene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2,2-Tetrachloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chlorobenzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Ethylbenzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Styrene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Xylenes (total)	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING
D -- SITE 17
SUBSURFACE SOIL -- VOLATILES -- REPORT NO. 10630

Lab Sample Number:	34926002	34925001	34925002RE	34823001				
Site	WHITING	WHITING	WHITING	WHITING				
Locator	17SB5-5-7A	17SB5-10-12	17SB5-20-22RE	17SB6-5-7				
Collect Date:	19-JAN-93	19-JAN-93	19-JAN-93	07-JAN-93				
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP VOLATILES 90-SOW

Chloromethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 UJ	ug/kg	13
Bromomethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Vinyl chloride	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Chloroethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Methylene chloride	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Acetone	12 UJ	ug/kg	12	19	ug/kg	12	10 UJ	ug/kg	10	13 U	ug/kg	13
Carbon disulfide	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
1,1-Dichloroethene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
1,1-Dichloroethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
1,2-Dichloroethene (total)	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Chloroform	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
1,2-Dichloroethane	12 U	ug/kg	12	12 UJ	ug/kg	12	10 UJ	ug/kg	10	13 U	ug/kg	13
2-Butanone	23 J	ug/kg	12	12 UJ	ug/kg	12	10 UJ	ug/kg	10	34	ug/kg	13
1,1,1-Trichloroethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Carbon tetrachloride	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Bromodichloromethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
1,2-Dichloropropane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
cis-1,3-Dichloropropene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Trichloroethene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Dibromochloromethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
1,1,2-Trichloroethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Benzene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
trans-1,3-Dichloropropene	12 U	ug/kg	12	12 U	ug/kg	12	10 UJ	ug/kg	10	13 U	ug/kg	13
Bromoform	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
4-Methyl-2-pentanone	12 UJ	ug/kg	12	12 UJ	ug/kg	12	10 UJ	ug/kg	10	4 J	ug/kg	13
2-Hexanone	12 UJ	ug/kg	12	12 UJ	ug/kg	12	10 UJ	ug/kg	10	13 U	ug/kg	13
Tetrachloroethene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Toluene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
1,1,2,2-Tetrachloroethane	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Chlorobenzene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Ethylbenzene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Styrene	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13
Xylenes (total)	12 U	ug/kg	12	12 U	ug/kg	12	10 U	ug/kg	10	13 U	ug/kg	13

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- VOLATILES -- REPORT NO. 10630

Lab Sample Number:	34823002			34906006			34906007			34906008		
Site	WHITING			WHITING	WHITING			WHITING	WHITING			
Locator	17SB6-10-12			17SB7-5-7	17SB7-15-17			17SB8-5-7	17SB8-5-7			
Collect Date:	07-JAN-93			18-JAN-93	18-JAN-93			18-JAN-93	18-JAN-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	11	UJ	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Bromomethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Vinyl chloride	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Chloroethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Methylene chloride	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Acetone	62	UJ	ug/kg	11	26	J	ug/kg	12	14	J	ug/kg	15
Carbon disulfide	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,1-Dichloroethene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,1-Dichloroethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,2-Dichloroethene (total)	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Chloroform	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,2-Dichloroethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
2-Butanone	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,1,1-Trichloroethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Carbon tetrachloride	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Bromodichloromethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,2-Dichloropropane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
cis-1,3-Dichloropropene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Trichloroethene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Dibromochloromethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,1,2-Trichloroethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Benzene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
trans-1,3-Dichloropropene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Bromoform	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
4-Methyl-2-pentanone	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
2-Hexanone	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Tetrachloroethene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Toluene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
1,1,2,2-Tetrachloroethane	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Chlorobenzene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Ethylbenzene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Styrene	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15
Xylenes (total)	11	U	ug/kg	11	12	U	ug/kg	12	15	U	ug/kg	15

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- VOLATILES -- REPORT NO. 10630

Lab Sample Number:	34906009		34815017		34815018	
Site	WHITING		WHITING		WHITING	
Locator	17SB8-10-12		17SB9-5-7		17SB9-10-12	
Collect Date:	18-JAN-93		06-JAN-93		06-JAN-93	
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CIP VOLATILES 90-SOW

Chemical Name	Regulation	Unit	Regulation	Unit	Regulation	Unit	Regulation	Unit
Chloromethane	11	U	ug/kg	11	12	UJ	ug/kg	12
Bromomethane	11	U	ug/kg	11	12	U	ug/kg	12
Vinyl chloride	11	U	ug/kg	11	12	U	ug/kg	12
Chloroethane	11	U	ug/kg	11	12	U	ug/kg	12
Methylene chloride	11	U	ug/kg	11	12	U	ug/kg	12
Acetone	11	J	ug/kg	11	120	UJ	ug/kg	12
Carbon disulfide	11	U	ug/kg	11	12	U	ug/kg	12
1,1-Dichloroethene	11	U	ug/kg	11	12	U	ug/kg	12
1,1-Dichloroethane	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethene (total)	11	U	ug/kg	11	12	U	ug/kg	12
Chloroform	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethane	11	U	ug/kg	11	12	U	ug/kg	12
2-Butanone	11	U	ug/kg	11	12	U	ug/kg	12
1,1,1-Trichloroethane	11	U	ug/kg	11	12	U	ug/kg	12
Carbon tetrachloride	11	U	ug/kg	11	12	U	ug/kg	12
Bromodichloromethane	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloropropane	11	U	ug/kg	11	12	U	ug/kg	12
cis-1,3-Dichloropropene	11	U	ug/kg	11	12	U	ug/kg	12
Trichloroethene	11	U	ug/kg	11	12	U	ug/kg	12
Dibromochloromethane	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2-Trichloroethane	11	U	ug/kg	11	12	U	ug/kg	12
Benzene	11	U	ug/kg	11	12	U	ug/kg	12
trans-1,3-Dichloropropene	11	U	ug/kg	11	12	U	ug/kg	12
Bromoform	11	U	ug/kg	11	12	U	ug/kg	12
4-Methyl-2-pentanone	11	U	ug/kg	11	12	U	ug/kg	12
2-Hexanone	11	U	ug/kg	11	12	U	ug/kg	12
Tetrachloroethene	11	U	ug/kg	11	12	U	ug/kg	12
Toluene	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2,2-Tetrachloroethane	11	U	ug/kg	11	12	U	ug/kg	12
Chlorobenzene	11	U	ug/kg	11	12	U	ug/kg	12
Ethylbenzene	11	U	ug/kg	11	12	U	ug/kg	12
Styrene	11	U	ug/kg	11	12	U	ug/kg	12
Xylenes (total)	11	U	ug/kg	11	12	U	ug/kg	12

~~1= NOT DETECTED 2=ESTIMATED VALUE~~

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
P= RESULT IS REJECTED AND UNUSABLE

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING . D -- SITE 17
 SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34925003			34925004			34925005			34925006		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB1-5-7			17SB1-15-17			17SB2-5-7			17SB2-10-12		
Collect Date:	19-JAN-93			19-JAN-93			19-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW												
Phenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
bis(2-Chloroethyl) ether	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2-Chlorophenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
1,3-Dichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
1,4-Dichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
1,2-Dichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2-Methylphenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,2'-oxybis(1-Chloropropane)	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
4-Methylphenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
N-Nitroso-di-n-propylamine	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Hexachloroethane	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Nitrobenzene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Isophorone	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2-Nitrophenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,4-Dimethylphenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
bis(2-Chloroethoxy) methane	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,4-Dichlorophenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
1,2,4-Trichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Naphthalene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
4-Chloroaniline	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Hexachlorobutadiene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
4-Chloro-3-methylphenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2-Methylnaphthalene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Hexachlorocyclopentadiene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,4,6-Trichlorophenol	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,4,5-Trichlorophenol	920	U	ug/kg	920	880	U	ug/kg	880	940	U	ug/kg	890
2-Chloronaphthalene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2-Nitroaniline	920	U	ug/kg	920	880	U	ug/kg	880	940	U	ug/kg	890
Dimethylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Acenaphthylene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,6-Dinitrotoluene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
3-Nitroaniline	920	U	ug/kg	920	880	U	ug/kg	880	940	U	ug/kg	890
Acenaphthene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,4-Dinitrophenol	920	U	ug/kg	920	880	U	ug/kg	880	940	U	ug/kg	890
4-Nitrophenol	920	U	ug/kg	920	880	U	ug/kg	880	940	U	ug/kg	890
Dibenzofuran	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
2,4-Dinitrotoluene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Diethylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
4-Chlorophenyl-phenylether	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Fluorene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
4-Nitroaniline	920	U	ug/kg	920	880	U	ug/kg	880	940	U	ug/kg	890
4,6-Dinitro-2-methylphenol	920	U	ug/kg	920	880	U	ug/kg	880	940	U	ug/kg	890
N-Nitrosodiphenylamine	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
4-Bromophenyl-phenylether	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Hexachlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Pentachlorophenol	920	UJ	ug/kg	920	880	UJ	ug/kg	880	940	UJ	ug/kg	890
Phenanthrene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Anthracene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Carbazole	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370
Di-n-butylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	370

NAS WHITING FIELD -- SITE 17
 SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34925003			34925004			34925005			34925006		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB1-5-7			17SB1-15-17			17SB2-5-7			17SB2-10-12		
Collect Date:	19-JAN-93			19-JAN-93			19-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Fluoranthene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Pyrene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Butylbenzylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
3,3-Dichlorobenzidine	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Benzo (a) anthracene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Chrysene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
bis(2-Ethylhexyl) phthalate	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Di-n-octylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Benzo (b) fluoranthene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Benzo (k) fluoranthene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Benzo (a) pyrene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Indeno (1,2,3-cd) pyrene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Dibenzo (a,h) anthracene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390
Benzo (g,h,i) perylene	380	U	ug/kg	380	360	U	ug/kg	360	390	U	ug/kg	390

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34823005			34823003			34823004			34926001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB3-10-12			17SB4-5-7			17SB4-10-12			17SB5-5-7		
Collect Date:	07-JAN-93			07-JAN-93			07-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW												
Phenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
bis(2-Chloroethyl) ether	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2-Chlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
1,3-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
1,4-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
1,2-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2-Methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,2-oxybis(1-Chloropropane)	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
4-Methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
N-Nitroso-di-n-propylamine	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Hexachloroethane	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Nitrobenzene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Isophorone	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2-Nitrophenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,4-Dimethylphenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
bis(2-Chloroethoxy) methane	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,4-Dichlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
1,2,4-Trichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Naphthalene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
4-Chloroaniline	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Hexachlorobutadiene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
4-Chloro-3-methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2-Methylnaphthalene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Hexachlorocyclopentadiene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,4,6-Trichlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,4,5-Trichlorophenol	920	U	ug/kg	920	950	U	ug/kg	950	900	U	ug/kg	980
2-Chloronaphthalene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2-Nitroaniline	920	U	ug/kg	920	950	U	ug/kg	950	900	U	ug/kg	980
Dimethylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Acenaphthylene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,6-Dinitrotoluene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
3-Nitroaniline	920	U	ug/kg	920	950	U	ug/kg	950	900	U	ug/kg	980
Acenaphthene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,4-Dinitrophenol	920	UJ	ug/kg	920	950	UJ	ug/kg	950	900	UJ	ug/kg	980
4-Nitrophenol	920	UJ	ug/kg	920	950	UJ	ug/kg	950	900	UJ	ug/kg	980
Dibenzofuran	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
2,4-Dinitrotoluene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Diethylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	94	J	ug/kg	370
4-Chlorophenyl-phenylether	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400
Fluorene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	400

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34823005			34823003			34823004			34926001		
Site	WHITING			WHITING	WHITING <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th>WHITING</th> <td data-cs="3" data-kind="parent">WHITING</td> <th data-kind="ghost"></th> <th data-kind="ghost"></th>			WHITING	WHITING			
Locator	17SB3-10-12			17SB4-5-7	17SB4-10-12			17SB5-5-7	17SB5-5-7			
Collect Date:	07-JAN-93			07-JAN-93	07-JAN-93			19-JAN-93	19-JAN-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	920	UJ	ug/kg	920	950	UJ	ug/kg	950	900	UJ	ug/kg	900
4,6-Dinitro-2-methylphenol	920	U	ug/kg	920	950	U	ug/kg	950	900	U	ug/kg	900
N-Nitrosodiphenylamine	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
4-Bromophenyl-phenylether	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Hexachlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Pentachlorophenol	920	U	ug/kg	920	950	U	ug/kg	950	900	U	ug/kg	900
Phenanthren	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Anthracene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Carbazole	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Di-n-butylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Pyrene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Butylbenzylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
3,3-Dichlorobenzidine	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Benzo (a) anthracene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Chrysene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
bis(2-Ethylhexyl) phthalate	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Di-n-octylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Benzo (b) fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Benzo (k) fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Benzo (a) pyrene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Indeno (1,2,3-cd) pyrene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Dibenzo (a,h) anthracene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370
Benzo (g,h,i) perylene	380	U	ug/kg	380	390	U	ug/kg	390	370	U	ug/kg	370

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FLD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34926002	34925001	34925002	34823001								
Site	WHITING	WHITING	WHITING	WHITING								
Locator	17SB5-5-7A	17SB5-10-12	17SB5-20-22	17SB6-5-7								
Collect Date:	19-JAN-93	19-JAN-93	19-JAN-93	07-JAN-93								
	VALUE	QUAL UNITS	DL	VALUE								
CLP SEMIVOLATILES 90-SOW												
Phenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
bis(2-Chloroethyl) ether	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2-Chlorophenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
1,3-Dichlorobenzene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
1,4-Dichlorobenzene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
1,2-Dichlorobenzene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2-Methylphenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,2-oxybis(1-Chloropropane)	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
4-Methylphenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
N-Nitroso-di-n-propylamine	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Hexachloroethane	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Nitrobenzene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Isophorone	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2-Nitrophenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,4-Dimethylphenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
bis(2-Chloroethoxy) methane	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,4-Dichlorophenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
1,2,4-Trichlorobenzene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Naphthalene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
4-Chloroaniline	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Hexachlorobutadiene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
4-Chloro-3-methylphenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2-Methylnaphthalene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Hexachlorocyclopentadiene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,4,6-Trichlorophenol	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,4,5-Trichlorophenol	960 U	ug/kg	960	940 U	ug/kg	940	820 U	ug/kg	820	980 U	ug/kg	980
2-Chloronaphthalene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2-Nitroaniline	960 U	ug/kg	960	940 U	ug/kg	940	820 U	ug/kg	820	980 U	ug/kg	980
Dimethylphthalate	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Acenaphthylene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,6-Dinitrotoluene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
3-Nitroaniline	960 U	ug/kg	960	940 U	ug/kg	940	820 U	ug/kg	820	980 U	ug/kg	980
Acenaphthene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,4-Dinitrophenol	960 U	ug/kg	960	940 U	ug/kg	940	820 U	ug/kg	820	980 UJ	ug/kg	980
4-Nitrophenol	960 U	ug/kg	960	940 U	ug/kg	940	820 U	ug/kg	820	980 UJ	ug/kg	980
Dibenzofuran	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
2,4-Dinitrotoluene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Diethylphthalate	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
4-Chlorophenyl-phenylether	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400
Fluorene	400 U	ug/kg	400	390 U	ug/kg	390	340 U	ug/kg	340	400 U	ug/kg	400

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34926002			34925001			34925002			34823001		
Site Locator	WHITING 17SB5-5-7A 19-JAN-93			WHITING 17SB5-10-12 19-JAN-93			WHITING 17SB5-20-22 19-JAN-93			WHITING 17SB6-5-7 07-JAN-93		
Collect Date:	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	960	U	ug/kg	960	940	U	ug/kg	940	820	U	ug/kg	820
4,6-Dinitro-2-methylphenol	960	U	ug/kg	960	940	U	ug/kg	940	820	U	ug/kg	820
N-Nitrosodiphenylamine	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
4-Bromophenyl-phenylether	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Hexachlorobenzene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Pentachlorophenol	960	U	ug/kg	960	940	UJ	ug/kg	940	820	U	ug/kg	820
Phenanthrene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Anthracene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Carbazole	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Di-n-butylphthalate	400	UJ	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Fluoranthene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Pyrene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Butylbenzylphthalate	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
3,3-Dichlorobenzidine	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Benzo (a) anthracene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Chrysene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
bis(2-Ethylhexyl) phthalate	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Di-n-octylphthalate	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Benzo (b) fluoranthene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Benzo (k) fluoranthene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Benzo (a) pyrene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Indeno (1,2,3-cd) pyrene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Dibenzo (a,h) anthracene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340
Benzo (g,h,i) perylene	400	U	ug/kg	400	390	U	ug/kg	390	340	U	ug/kg	340

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34823002		34906006		34906007		34906008			
Site	WHITING		WHITING		WHITING		WHITING			
Locator	17SB6-10-12		17SB7-5-7		17SB7-15-17		17SB8-5-7			
Collect Date:	07-JAN-93		18-JAN-93		18-JAN-93		18-JAN-93			
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	

CLP SEMIVOLATILES 90-SOW

	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Phenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
bis(2-Chloroethyl) ether	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2-Chlorophenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
1,3-Dichlorobenzene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
1,4-Dichlorobenzene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
1,2-Dichlorobenzene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2-Methylphenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,2-oxybis(1-Chloropropane)	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
4-Methylphenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
N-Nitroso-di-n-propylamine	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Hexachloroethane	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Nitrobenzene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Isophorone	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2-Nitrophenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,4-Dimethylphenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
bis(2-Chloroethoxy) methane	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,4-Dichlorophenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
1,2,4-Trichlorobenzene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Naphthalene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
4-Chloroaniline	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Hexachlorobutadiene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
4-Chloro-3-methylphenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2-Methylnaphthalene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Hexachlorocyclopentadiene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,4,6-Trichlorophenol	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,4,5-Trichlorophenol	850 U	ug/kg	850	940 U	ug/kg	940	840 U	ug/kg	840	980 U	ug/kg	980
2-Chloronaphthalene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2-Nitroaniline	850 U	ug/kg	850	940 U	ug/kg	940	840 U	ug/kg	840	980 U	ug/kg	980
Dimethylphthalate	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Acenaphthylene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,6-Dinitrotoluene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
3-Nitroaniline	850 U	ug/kg	850	940 U	ug/kg	940	840 U	ug/kg	840	980 U	ug/kg	980
Acenaphthene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,4-Dinitrophenol	850 UJ	ug/kg	850	940 U	ug/kg	940	840 U	ug/kg	840	980 U	ug/kg	980
4-Nitrophenol	850 UJ	ug/kg	850	940 U	ug/kg	940	840 U	ug/kg	840	980 U	ug/kg	980
Dibenzofuran	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
2,4-Dinitrotoluene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Diethylphthalate	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
4-Chlorophenyl-phenylether	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400
Fluorene	350 U	ug/kg	350	390 U	ug/kg	390	350 U	ug/kg	350	400 U	ug/kg	400

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34823002			34906006			34906007			34906008		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB6-10-12			17SB7-5-7			17SB7-15-17			17SB8-5-7		
Collect Date:	07-JAN-93			18-JAN-93			18-JAN-93			18-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	850	UJ	ug/kg	850	940	U	ug/kg	940	840	U	ug/kg	840
4,6-Dinitro-2-methylphenol	850	U	ug/kg	850	940	U	ug/kg	940	840	U	ug/kg	840
N-Nitrosodiphenylamine	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
4-Bromophenyl-phenylether	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Hexachlorobenzene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Pentachlorophenol	850	U	ug/kg	850	940	U	ug/kg	940	840	U	ug/kg	840
Phenanthrene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Anthracene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Carbazole	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Di-n-butylphthalate	350	U	ug/kg	350	390	UJ	ug/kg	390	350	UJ	ug/kg	350
Fluoranthene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Pyrene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Butylbenzylphthalate	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
3,3-Dichlorobenzidine	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Benzo (a) anthracene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Chrysene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
bis(2-Ethylhexyl) phthalate	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Di-n-octylphthalate	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Benzo (b) fluoranthene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Benzo (k) fluoranthene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Benzo (a) pyrene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Indeno (1,2,3-cd) pyrene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Dibenzo (a,h) anthracene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350
Benzo (g,h,i) perylene	350	U	ug/kg	350	390	U	ug/kg	390	350	U	ug/kg	350

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34906009	34815017	34815018					
Site	WHITING	WHITING	WHITING					
Locator	17SB8-10-12	17SB9-5-7	17SB9-10-12					
Collect Date:	18-JAN-93	06-JAN-93	06-JAN-93					
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP SEMIVOLATILES 90-SOW

Phenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
bis(2-Chloroethyl) ether	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2-Chlorophenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
1,3-Dichlorobenzene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
1,4-Dichlorobenzene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
1,2-Dichlorobenzene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2-Methylphenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,2-oxybis(1-chloropropane)	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
4-Methylphenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
N-Nitroso-di-n-propylamine	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Hexachloroethane	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Nitrobenzene	360	U	ug/kg	360	390	UJ	ug/kg	390	380	U	ug/kg	380
Isophorone	360	U	ug/kg	360	390	UJ	ug/kg	390	380	U	ug/kg	380
2-Nitrophenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dimethylphenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
bis(2-Chloroethoxy) methane	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dichlorophenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
1,2,4-Trichlorobenzene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Naphthalene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
4-Chloroaniline	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Hexachlorobutadiene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
4-Chloro-3-methylphenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2-Methylnaphthalene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Hexachlorocyclopentadiene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,4,6-Trichlorophenol	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,4,5-Trichlorophenol	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
2-Chloronaphthalene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2-Nitroaniline	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
Dimethylphthalate	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Acenaphthylene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,6-Dinitrotoluene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
3-Nitroaniline	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
Acenaphthene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dinitrophenol	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
4-Nitrophenol	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
Dibenzofuran	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dinitrotoluene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Diethylphthalate	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
4-Chlorophenyl-phenylether	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Fluorene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- SEMIVOLATILES -- REPORT NO. 10631

Lab Sample Number:	34906009			34815017			34815018					
Site	WHITING			WHITING			WHITING					
Locator	17SB8-10-12			17SB9-5-7			17SB9-10-12					
Collect Date:	18-JAN-93			06-JAN-93			06-JAN-93					
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE			
4-Nitroaniline	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
4,6-Dinitro-2-methylphenol	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
N-Nitrosodiphenylamine	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
4-Bromophenyl-phenylether	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Hexachlorobenzene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Pentachlorophenol	880	U	ug/kg	880	940	U	ug/kg	940	930	U	ug/kg	930
Phenanthrene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Anthracene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Carbazole	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Di-n-butylphthalate	310	BJ	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Fluoranthene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Pyrene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Butylbenzylphthalate	360	U	ug/kg	360	390	UJ	ug/kg	390	380	U	ug/kg	380
3,3-Dichlorobenzidine	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (a) anthracene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Chrysene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
bis(2-Ethylhexyl) phthalate	360	U	ug/kg	360	390	UJ	ug/kg	390	380	U	ug/kg	380
Di-n-octylphthalate	360	U	ug/kg	360	390	UJ	ug/kg	390	380	U	ug/kg	380
Benzo (b) fluoranthene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (k) fluoranthene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (a) pyrene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Indeno (1,2,3-cd) pyrene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Dibenzo (a,h) anthracene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (g,h,i) perylene	360	U	ug/kg	360	390	U	ug/kg	390	380	U	ug/kg	380

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- PESTICIDES/PCBs -- REPORT NO. 10632

Lab Sample Number:	34925003			34925004			34925005			34925006		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB1-5-7			17SB1-15-17			17SB2-5-7			17SB2-10-12		
Collect Date:	19-JAN-93			19-JAN-93			19-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW												
alpha-BHC	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
beta-BHC	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
delta-BHC	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
gamma-BHC (Lindane)	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Heptachlor	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Aldrin	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Heptachlor epoxide	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Endosulfan I	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Dieldrin	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.9
4,4-DDE	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.9
Endrin	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.9
Endosulfan II	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.9
4,4-DDD	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.7
Endosulfan sulfate	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.7
4,4-DDT	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.7
Methoxychlor	20	UJ	ug/kg	20	19	UJ	ug/kg	19	20	UJ	ug/kg	20
Endrin ketone	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.7
Endrin aldehyde	3.8	UJ	ug/kg	3.8	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.7
alpha-Chlordane	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	1.9
gamma-Chlordane	2	UJ	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	1.9
Toxaphene	200	UJ	ug/kg	200	190	UJ	ug/kg	190	200	UJ	ug/kg	200
Aroclor-1016	38	UJ	ug/kg	38	36	UJ	ug/kg	36	39	UJ	ug/kg	39
Aroclor-1221	77	UJ	ug/kg	77	74	UJ	ug/kg	74	79	UJ	ug/kg	79
Aroclor-1232	38	UJ	ug/kg	38	36	UJ	ug/kg	36	39	UJ	ug/kg	39
Aroclor-1242	38	UJ	ug/kg	38	36	UJ	ug/kg	36	39	UJ	ug/kg	39
Aroclor-1248	38	UJ	ug/kg	38	36	UJ	ug/kg	36	39	UJ	ug/kg	37
Aroclor-1254	38	UJ	ug/kg	38	36	UJ	ug/kg	36	39	UJ	ug/kg	37
Aroclor-1260	38	UJ	ug/kg	38	36	UJ	ug/kg	36	39	UJ	ug/kg	37

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 SUBSURFACE SOIL -- PESTICIDES/PCBs -- REPORT NO. 10632

Lab Sample Number:	34823005	34823003	34823004	34926001				
Site	WHITING	WHITING	WHITING	WHITING				
Locator	17SB3-10-12	17SB4-5-7	17SB4-10-12	17SB5-5-7				
Collect Date:	07-JAN-93	07-JAN-93	07-JAN-93	19-JAN-93				
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS				
CLP PESTICIDES/PCBs 90-SOW								
alpha-BHC	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
beta-BHC	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
delta-BHC	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
gamma-BHC (Lindane)	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
Heptachlor	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
Aldrin	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
Heptachlor epoxide	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
Endosulfan I	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
Dieldrin	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
4,4-DDE	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
Endrin	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
Endosulfan II	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
4,4-DDD	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
Endosulfan sulfate	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
4,4-DDT	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
Methoxychlor	20 UJ ug/kg	20	20 UJ ug/kg	20	19 UJ ug/kg	19	21 UJ ug/kg	21
Endrin ketone	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
Endrin aldehyde	3.8 UJ ug/kg	3.8	3.9 UJ ug/kg	3.9	3.7 UJ ug/kg	3.7	4 UJ ug/kg	4
alpha-Chlordane	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
gamma-Chlordane	2 UJ ug/kg	2	2 UJ ug/kg	2	1.9 UJ ug/kg	1.9	2.1 UJ ug/kg	2.1
Toxaphene	200 UJ ug/kg	200	200 UJ ug/kg	200	190 UJ ug/kg	190	210 UJ ug/kg	210
Aroclor-1016	38 UJ ug/kg	38	39 UJ ug/kg	39	37 UJ ug/kg	37	40 UJ ug/kg	40
Aroclor-1221	77 UJ ug/kg	77	80 UJ ug/kg	80	75 UJ ug/kg	75	82 UJ ug/kg	82
Aroclor-1232	38 UJ ug/kg	38	39 UJ ug/kg	39	37 UJ ug/kg	37	40 UJ ug/kg	40
Aroclor-1242	38 UJ ug/kg	38	39 UJ ug/kg	39	37 UJ ug/kg	37	40 UJ ug/kg	40
Aroclor-1248	38 UJ ug/kg	38	39 UJ ug/kg	39	37 UJ ug/kg	37	40 UJ ug/kg	40
Aroclor-1254	38 UJ ug/kg	38	39 UJ ug/kg	39	37 UJ ug/kg	37	40 UJ ug/kg	40
Aroclor-1260	38 UJ ug/kg	38	39 UJ ug/kg	39	37 UJ ug/kg	37	40 UJ ug/kg	40

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FLD -- SITE 17
SUBSURFACE SOIL -- PESTICIDES/PCBs -- REPORT NO. 10632

Lab Sample Number:	34926002			34925001			34925002			34823001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB5-5-7A			17SB5-10-12			17SB5-20-22			17SB6-5-7		
Collect Date:	19-JAN-93			19-JAN-93			19-JAN-93			07-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW												
alpha-BHC	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
beta-BHC	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
delta-BHC	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
gamma-BHC (Lindane)	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
Heptachlor	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
Aldrin	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
Heptachlor epoxide	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
Endosulfan I	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
Dieldrin	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
4,4-DDE	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
Endrin	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
Endosulfan II	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
4,4-DDD	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
Endosulfan sulfate	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
4,4-DDT	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
Methoxychlor	20	UJ	ug/kg	20	20	UJ	ug/kg	20	17	UJ	ug/kg	17
Endrin ketone	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
Endrin aldehyde	4	UJ	ug/kg	4	3.9	UJ	ug/kg	3.9	3.4	UJ	ug/kg	3.4
alpha-Chlordane	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
gamma-Chlordane	2	UJ	ug/kg	2	2	UJ	ug/kg	2	1.7	UJ	ug/kg	1.7
Toxaphene	200	UJ	ug/kg	200	200	UJ	ug/kg	200	170	UJ	ug/kg	170
Aroclor-1016	40	UJ	ug/kg	40	39	UJ	ug/kg	39	34	UJ	ug/kg	34
Aroclor-1221	81	UJ	ug/kg	81	79	UJ	ug/kg	79	68	UJ	ug/kg	68
Aroclor-1232	40	UJ	ug/kg	40	39	UJ	ug/kg	39	34	UJ	ug/kg	34
Aroclor-1242	40	UJ	ug/kg	40	39	UJ	ug/kg	39	34	UJ	ug/kg	34
Aroclor-1248	40	UJ	ug/kg	40	39	UJ	ug/kg	39	34	UJ	ug/kg	34
Aroclor-1254	40	UJ	ug/kg	40	39	UJ	ug/kg	39	34	UJ	ug/kg	34
Aroclor-1260	40	UJ	ug/kg	40	39	UJ	ug/kg	39	34	UJ	ug/kg	34

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 SUBSURFACE SOIL -- PESTICIDES/PCBs -- REPORT NO. 10632

Lab Sample Number:	34823002	34906006	34906007	34906008					
Site	WHITING	WHITING	WHITING	WHITING					
Locator	17SB6-10-12	17SB7-5-7	17SB7-15-17	17SB8-5-7					
Collect Date:	07-JAN-93	18-JAN-93	18-JAN-93	18-JAN-93					
	VALUE	QUAL UNITS	DL	VALUE					
CLP PESTICIDES/PCBS 90-SOW									
alpha-BHC	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
beta-BHC	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
delta-BHC	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
gamma-BHC (Lindane)	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
Heptachlor	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
Aldrin	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
Heptachlor epoxide	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
Endosulfan I	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
Dieldrin	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
4,4-DDE	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
Endrin	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
Endosulfan II	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
4,4-DDD	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
Endosulfan sulfate	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
4,4-DDT	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
Methoxychlor	18 UJ	ug/kg	18	20 UJ ug/kg	20	18 UJ ug/kg	18	20 UJ ug/kg	20
Endrin ketone	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
Endrin aldehyde	3.5 UJ	ug/kg	3.5	3.9 UJ ug/kg	3.9	3.5 UJ ug/kg	3.5	4 UJ ug/kg	4
alpha-Chlordane	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
gamma-Chlordane	1.8 UJ	ug/kg	1.8	2 UJ ug/kg	2	1.8 UJ ug/kg	1.8	2 UJ ug/kg	2
Toxaphene	180 UJ	ug/kg	180	200 UJ ug/kg	200	180 UJ ug/kg	180	200 UJ ug/kg	200
Aroclor-1016	35 UJ	ug/kg	35	39 UJ ug/kg	39	35 UJ ug/kg	35	40 UJ ug/kg	40
Aroclor-1221	72 UJ	ug/kg	72	79 UJ ug/kg	79	71 UJ ug/kg	71	81 UJ ug/kg	81
Aroclor-1232	35 UJ	ug/kg	35	39 UJ ug/kg	39	35 UJ ug/kg	35	40 UJ ug/kg	40
Aroclor-1242	35 UJ	ug/kg	35	39 UJ ug/kg	39	35 UJ ug/kg	35	40 UJ ug/kg	40
Aroclor-1248	35 UJ	ug/kg	35	39 UJ ug/kg	39	35 UJ ug/kg	35	40 UJ ug/kg	40
Aroclor-1254	35 UJ	ug/kg	35	39 UJ ug/kg	39	35 UJ ug/kg	35	40 UJ ug/kg	40
Aroclor-1260	35 UJ	ug/kg	35	39 UJ ug/kg	39	35 UJ ug/kg	35	40 UJ ug/kg	40

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING, I.D. -- SITE 17
SUBSURFACE SOIL -- PESTICIDES/PCBS -- REPORT NO. 10632

Lab Sample Number:	34906008RE			34906009			34815017			34815018		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB8-5-7RE			17SB8-10-12			17SB9-5-7			17SB9-10-12		
Collect Date:	18-JAN-93			18-JAN-93			06-JAN-93			06-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW												
alpha-BHC	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
beta-BHC	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
delta-BHC	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
gamma-BHC (Lindane)	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Heptachlor	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Aldrin	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Heptachlor epoxide	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Endosulfan I	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Dieldrin	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
4,4-DDE	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
Endrin	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
Endosulfan II	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
4,4-DDD	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
Endosulfan sulfate	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
4,4-DDT	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
Methoxychlor	20	U	ug/kg	20	19	UJ	ug/kg	19	20	UJ	ug/kg	20
Endrin ketone	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
Endrin aldehyde	4	U	ug/kg	4	3.6	UJ	ug/kg	3.6	3.9	UJ	ug/kg	3.8
alpha-Chlordane	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
gamma-Chlordane	2	U	ug/kg	2	1.9	UJ	ug/kg	1.9	2	UJ	ug/kg	2
Toxaphene	200	U	ug/kg	200	190	UJ	ug/kg	190	200	UJ	ug/kg	200
Aroclor-1016	40	U	ug/kg	40	36	UJ	ug/kg	36	39	UJ	ug/kg	38
Aroclor-1221	81	U	ug/kg	81	74	UJ	ug/kg	74	79	UJ	ug/kg	78
Aroclor-1232	40	U	ug/kg	40	36	UJ	ug/kg	36	39	UJ	ug/kg	38
Aroclor-1242	40	U	ug/kg	40	36	UJ	ug/kg	36	39	UJ	ug/kg	38
Aroclor-1248	40	U	ug/kg	40	36	UJ	ug/kg	36	39	UJ	ug/kg	38
Aroclor-1254	40	U	ug/kg	40	36	UJ	ug/kg	36	39	UJ	ug/kg	38
Aroclor-1260	40	U	ug/kg	40	36	UJ	ug/kg	36	39	UJ	ug/kg	38

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- INORGANICS -- REPORT NO. 10633

Lab Sample Number:	34925003			34925004			34925005			34925006		
Site	WHITING			WHITING		<th>WHITING</th> <td></td> <td><th>WHITING</th><td></td><td></td></td>	WHITING		<th>WHITING</th> <td></td> <td></td>	WHITING		
Locator	17SB1-5-7			17SB1-15-17			17SB2-5-7			17SB2-10-12		
Collect Date:	19-JAN-93			19-JAN-93			19-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE												
Aluminum	33200	mg/kg	40		24600	mg/kg	40		55200	mg/kg	40	
Antimony	5.6 U	mg/kg	12		5.4 U	mg/kg	12		5.8 U	mg/kg	12	
Arsenic	8	mg/kg	2		5.5	mg/kg	2		2.2 J	mg/kg	2	
Barium	14.3 J	mg/kg	40		5.8 J	mg/kg	40		10 J	mg/kg	40	
Beryllium	.28 J	mg/kg	1		.15 J	mg/kg	1		.45 J	mg/kg	1	
Cadmium	.89 U	mg/kg	1		.87 U	mg/kg	1		.93 U	mg/kg	1	
Calcium	87.9 J	mg/kg	1000		41.3 J	mg/kg	1000		85.9 J	mg/kg	1000	
Chromium	27.9	mg/kg	2		15.9	mg/kg	2		45.4	mg/kg	2	
Cobalt	.83 J	mg/kg	10		.49 U	mg/kg	10		.57 J	mg/kg	10	
Copper	6.7	mg/kg	5		4.3 J	mg/kg	5		9.9	mg/kg	5	
Iron	22300	mg/kg	20		13200	mg/kg	20		39100	mg/kg	20	
Lead	44.7	mg/kg	1		3.4	mg/kg	1		7.8	mg/kg	1	
Magnesium	177 J	mg/kg	1000		96.4 J	mg/kg	1000		186 J	mg/kg	1000	
Manganese	40.6	mg/kg	3		15.1	mg/kg	3		32.4	mg/kg	3	
Mercury	.02 U	mg/kg	.1		.02 U	mg/kg	.1		.03 J	mg/kg	.1	
Nickel	4.1 J	mg/kg	8		2.8 J	mg/kg	8		4.2 J	mg/kg	8	
Potassium	1180	mg/kg	1000		113 U	mg/kg	1000		121 U	mg/kg	1000	
Selenium	4	mg/kg	1		1.5	mg/kg	1		2.3	mg/kg	1	
Silver	.71 J	mg/kg	2		.53 U	mg/kg	2		1.3 J	mg/kg	2	
Sodium	19.9 J	mg/kg	1000		12.2 U	mg/kg	1000		49.7 J	mg/kg	1000	
Thallium	5.7 U	mg/kg	2		5.6 U	mg/kg	2		6 U	mg/kg	2	
Vanadium	57.6	mg/kg	10		36.4	mg/kg	10		100	mg/kg	10	
Zinc	6.8	mg/kg	4		3.3 J	mg/kg	4		5.8	mg/kg	4	
Cyanide	.51 J	mg/kg	1		.52 J	mg/kg	1		.51 J	mg/kg	1	

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- INORGANICS -- REPORT NO. 10633

Lab Sample Number:	34823005			34823003			34823004			34926001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB3-10-12			17SB4-5-7			17SB4-10-12			17SB5-5-7		
Collect Date:	07-JAN-93			07-JAN-93			07-JAN-93			19-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE												
Aluminum	5800	mg/kg	40		10000	mg/kg	40		4550	mg/kg	40	
Antimony	2.8 U	mg/kg	12		2.9 U	mg/kg	12		2.7 U	mg/kg	12	
Arsenic	2.1 J	mg/kg	2		.5 J	mg/kg	2		1.3 J	mg/kg	2	
Barium	2.4 J	mg/kg	40		4.8 J	mg/kg	40		2.5 J	mg/kg	40	
Beryllium	.11 U	mg/kg	1		.12 U	mg/kg	1		.11 U	mg/kg	1	
Cadmium	.28 U	mg/kg	1		.75 J	mg/kg	1		.27 U	mg/kg	1	
Calcium	79.7 J	mg/kg	1000		156 J	mg/kg	1000		80.8 J	mg/kg	1000	
Chromium	9.3	mg/kg	2		26.3	mg/kg	2		10.3	mg/kg	2	
Cobalt	1.3 U	mg/kg	10		1.4 U	mg/kg	10		1.3 U	mg/kg	10	
Copper	2.6 J	mg/kg	5		6.3	mg/kg	5		3.2 J	mg/kg	5	
Iron	10400	mg/kg	20		29300	mg/kg	20		11900	mg/kg	20	
Lead	2.9	mg/kg	1		2.6	mg/kg	1		2.8	mg/kg	1	
Magnesium	33.6 J	mg/kg	1000		84.8 J	mg/kg	1000		37.6 J	mg/kg	1000	
Manganese	12.4	mg/kg	3		27.9	mg/kg	3		13.1	mg/kg	3	
Mercury	.03 U	mg/kg	-1		.03 U	mg/kg	-1		.03 J	mg/kg	-1	
Nickel	1.8 U	mg/kg	8		1.8 U	mg/kg	8		1.7 U	mg/kg	8	
Potassium	96.9 J	mg/kg	1000		53.6 J	mg/kg	1000		42.7 U	mg/kg	1000	
Selenium	.11 U	mg/kg	1		.12 U	mg/kg	1		.11 U	mg/kg	1	
Silver	.48 U	mg/kg	2		.5 U	mg/kg	2		.47 U	mg/kg	2	
Sodium	184 J	mg/kg	1000		207 J	mg/kg	1000		204 J	mg/kg	1000	
Thallium	.16 U	mg/kg	2		.17 U	mg/kg	2		.16 U	mg/kg	2	
Vanadium	27.7	mg/kg	10		74	mg/kg	10		31.2	mg/kg	10	
Zinc	4.3 J	mg/kg	4		8.9	mg/kg	4		4.8	mg/kg	4	
Cyanide	.17 U	mg/kg	1		.18 U	mg/kg	1		.17 U	mg/kg	1	

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

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NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- INORGANICS -- REPORT NO. 10633

Lab Sample Number:	34926002			34925001			34925002			34823001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	17SB5-5-7A			17SB5-10-12			17SB5-20-22			17SB6-5-7		
Collect Date:	19-JAN-93			19-JAN-93			19-JAN-93			07-JAN-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE												
Aluminum	21100	J	mg/kg	40	7650	mg/kg	40	1180	mg/kg	40	9250	mg/kg
Antimony	5.9	R	mg/kg	12	5.8	U	12	5	U	12	3	U
Arsenic	3.3		mg/kg	2	2.2	J	2	.43	J	2	.71	J
Barium	8.3	J	mg/kg	40	3.8	J	40	.32	J	40	3.9	J
Beryllium	.37	UJ	mg/kg	1	.13	J	1	.06	U	1	.12	U
Cadmium	.95	UJ	mg/kg	1	.93	U	1	.81	U	1	2.5	mg/kg
Calcium	31.8	UJ	mg/kg	1000	159	J	1000	7.6	J	1000	147	J
Chromium	35.1	J	mg/kg	2	10.6	mg/kg	2	1.2	J	2	50.5	mg/kg
Cobalt	1	J	mg/kg	10	.53	U	10	.46	U	10	1.6	J
Copper	7.9	J	mg/kg	5	7.8	mg/kg	5	.34	U	5	22.7	mg/kg
Iron	43400		mg/kg	20	12400	mg/kg	20	742	mg/kg	20	89800	mg/kg
Lead	6.8	J	mg/kg	1	3.5	mg/kg	1	.18	J	1	8.3	mg/kg
Magnesium	64.5	UJ	mg/kg	1000	111	J	1000	7.3	U	1000	45.5	J
Manganese	30		mg/kg	3	42.6	mg/kg	3	1.5	J	3	226	mg/kg
Mercury	.02	J	mg/kg	.1	.02	U	.1	.02	U	.1	.04	J
Nickel	3	UJ	mg/kg	3	2.9	U	8	2.5	U	8	3.1	J
Potassium	345	J	mg/kg	1000	121	U	1000	105	U	1000	437	J
Selenium	.87	J	mg/kg	1	1.1	J	1	.44	U	1	.12	U
Silver	1.9	J	mg/kg	2	.78	J	2	.49	U	2	1.3	J
Sodium	33.4	UJ	mg/kg	1000	13.1	U	1000	11.4	U	1000	185	J
Thallium	6.1	R	mg/kg	2	.6	U	2	.52	U	2	.17	U
Vanadium	91.8	J	mg/kg	10	37.8	mg/kg	10	1.6	J	10	105	mg/kg
Zinc	5.3	J	mg/kg	4	1.9	J	4	.52	J	4	18.9	mg/kg
Cyanide	.6	UJ	mg/kg	1	.51	J	1	.46	J	1	.18	U

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- INORGANICS -- REPORT NO. 10633

Lab Sample Number:	34823002	Site	WHITING	Locator	17SB6-10-12	Collect Date:	07-JAN-93	34906006	WHITING	17SB7-5-7	18-JAN-93	34906007	WHITING	17SB7-15-17	18-JAN-93	34906008	WHITING	17SB8-5-7	18-JAN-93	34906008	WHITING	17SB8-5-7	18-JAN-93
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL					
CLP METALS AND CYANIDE																							
Aluminum	3730	mg/kg	40	45000	mg/kg	40	1540	mg/kg	40	53300	mg/kg	40											
Antimony	.26 U	mg/kg	12	8 J	mg/kg	12	5.1 U	mg/kg	12	6 U	mg/kg	12											
Arsenic	.68 J	mg/kg	2	2.4 J	mg/kg	2	1.1 J	mg/kg	2	6.4	mg/kg	2											
Barium	1.5 J	mg/kg	40	7.2 J	mg/kg	40	.1 UJ	mg/kg	40	10.5 J	mg/kg	40											
Beryllium	.11 U	mg/kg	1	.07 U	mg/kg	1	.06 U	mg/kg	1	.07 U	mg/kg	1											
Cadmium	.26 U	mg/kg	1	.99 U	mg/kg	1	.82 U	mg/kg	1	.95 U	mg/kg	1											
Calcium	64.9 J	mg/kg	1000	16.9 J	mg/kg	1000	14.2 J	mg/kg	1000	7.9 U	mg/kg	1000											
Chromium	4.8	mg/kg	2	45.8	mg/kg	2	2.3	mg/kg	2	46.1	mg/kg	2											
Cobalt	1.2 U	mg/kg	10	4.2 J	mg/kg	10	.47 U	mg/kg	10	4.4 J	mg/kg	10											
Copper	3.7 J	mg/kg	5	1.4 J	mg/kg	5	1.1 J	mg/kg	5	5.4 J	mg/kg	5											
Iron	6240	mg/kg	20	50700	mg/kg	20	1330	mg/kg	20	48400	mg/kg	20											
Lead	.92	mg/kg	1	6.9	mg/kg	1	.8 J	mg/kg	1	8.5	mg/kg	1											
Magnesium	18.3 J	mg/kg	1000	115 J	mg/kg	1000	9.4 J	mg/kg	1000	187 J	mg/kg	1000											
Manganese	78.2	mg/kg	3	76.9	mg/kg	3	7	mg/kg	3	41.5	mg/kg	3											
Mercury	.03 U	mg/kg	.1	.02 U	mg/kg	.1	.02 U	mg/kg	.1	.02 U	mg/kg	.1											
Nickel	1.6 U	mg/kg	8	3.1 J	mg/kg	8	2.6 U	mg/kg	8	6.9 J	mg/kg	8											
Potassium	40.9 U	mg/kg	1000	319 J	mg/kg	1000	106 U	mg/kg	1000	736 J	mg/kg	1000											
Selenium	.11 U	mg/kg	1	.64 J	mg/kg	1	.91 J	mg/kg	1	3.4	mg/kg	1											
Silver	.45 U	mg/kg	2	1 J	mg/kg	2	.5 UJ	mg/kg	2	1.4 J	mg/kg	2											
Sodium	168 J	mg/kg	1000	13.9 U	mg/kg	1000	11.5 U	mg/kg	1000	16.4 J	mg/kg	1000											
Thallium	.15 U	mg/kg	2	6.4 U	mg/kg	2	5.3 U	mg/kg	2	6.1 U	mg/kg	2											
Vanadium	15.7	mg/kg	10	99.3	mg/kg	10	3.1 J	mg/kg	10	95.7	mg/kg	10											
Zinc	2.9 J	mg/kg	4	1.6 J	mg/kg	4	.81 J	mg/kg	4	3.3 J	mg/kg	4											
Cyanide	.16 U	mg/kg	1	.66 J	mg/kg	1	.43 J	mg/kg	1	.45 J	mg/kg	1											

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
SUBSURFACE SOIL -- INORGANICS -- REPORT NO. 10633

Lab Sample Number:	34906009	34815017	34815018					
Site	WHITING	WHITING	WHITING					
Locator	17SB8-10-12	17SB9-5-7	17SB9-10-12					
Collect Date:	18-JAN-93	06-JAN-93	06-JAN-93					
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

CLP METALS AND CYANIDE

Aluminum	19000	mg/kg	40	7800	mg/kg	40	6220	mg/kg	40
Antimony	5.4 U	mg/kg	12	7 J	mg/kg	12	5.8 U	mg/kg	12
Arsenic	3.1 J	mg/kg	2	3	mg/kg	2	1.8 J	mg/kg	2
Barium	3.8 J	mg/kg	40	3 J	mg/kg	40	3.6 J	mg/kg	40
Beryllium	.06 U	mg/kg	1	.06 U	mg/kg	1	.06 U	mg/kg	1
Cadmium	.87 U	mg/kg	1	.93 U	mg/kg	1	.92 U	mg/kg	1
Calcium	7.2 U	mg/kg	1000	7.7 U	mg/kg	1000	7.7 U	mg/kg	1000
Chromium	12.8	mg/kg	2	24.3	mg/kg	2	19.9	mg/kg	2
Cobalt	.64 J	mg/kg	10	2.1 J	mg/kg	10	.92 J	mg/kg	10
Copper	2.3 J	mg/kg	5	.39 U	mg/kg	5	.39 U	mg/kg	5
Iron	10500	mg/kg	20	31600	mg/kg	20	22200	mg/kg	20
Lead	2.7	mg/kg	1	8	mg/kg	1	5.4	mg/kg	1
Magnesium	64.7 J	mg/kg	1000	30.7 J	mg/kg	1000	27.1 J	mg/kg	1000
Manganese	28.7	mg/kg	3	24.4	mg/kg	3	15	mg/kg	3
Mercury	.02 U	mg/kg	.1	.02 J	mg/kg	.1	.03 J	mg/kg	.1
Nickel	3.9 J	mg/kg	8	2.9 U	mg/kg	8	2.9 U	mg/kg	8
Potassium	112 U	mg/kg	1000	121 U	mg/kg	1000	120 U	mg/kg	1000
Selenium	.61 J	mg/kg	1	.65 J	mg/kg	1	.5 U	mg/kg	1
Silver	.53 U	mg/kg	2	1.2 J	mg/kg	2	.81 J	mg/kg	2
Sodium	12.2 U	mg/kg	1000	13.1 U	mg/kg	1000	13 U	mg/kg	1000
Thallium	.56 U	mg/kg	2	6 U	mg/kg	2	5.9 U	mg/kg	2
Vanadium	27.8	mg/kg	10	82	mg/kg	10	60.5	mg/kg	10
Zinc	1.7 J	mg/kg	4	.37 U	mg/kg	4	.37 U	mg/kg	4
Cyanide	.46 J	mg/kg	1	.53 J	mg/kg	1	.48 J	mg/kg	1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING -- SITE 17
GROUNDWATER -- VOLATILES -- REPORT NO. 10634

Lab Sample Number:	90178005			90180002			RB873003			RB873002		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	WHF17-1			WHF17-1B			17G00101			17G00102		
Collect Date:	19-OCT-93			20-OCT-93			18-JUL-96			18-JUL-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
GROUNDWATER -- VOLATILES -- REPORT NO. 10634

Lab Sample Number:	90179001			90179002			RB873004			90181001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	WHF17-2B			WHF17-2BA			17G00201			WHF17-3		
Collect Date:	20-OCT-93			20-OCT-93			18-JUL-96			21-OCT-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW												
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 GROUNDWATER -- VOLATILES -- REPORT NO. 10634

Lab Sample Number:	RB873005
Site	WHITING
Locator	17G00301
Collect Date:	18-JUL-96

VALUE	QUAL	UNITS	DL
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CLP VOLATILES 90-SOW

Chloromethane	10	U	ug/l	10
Bromomethane	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10
Chloroethane	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10
Acetone	10	UJ	ug/l	10
Carbon disulfide	2	J	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10
Chloroform	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10
2-Butanone	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10
Benzene	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10
Bromoform	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10
Toluene	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10
Styrene	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10635

Lab Sample Number:	90178005			90180002			RB873003			RB873002		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	WHF17-1			WHF17-1B			17G00101			17G00102		
Collect Date:	19-OCT-93			20-OCT-93			18-JUL-96			18-JUL-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW												
Phenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
bis(2-Chloroethyl) ether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Chlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,3-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,4-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,2-oxybis(1-Chloropropane)	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
N-Nitroso-di-n-propylamine	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachloroethane	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Nitrobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Isophorone	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitrophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dimethylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
bis(2-Chloroethoxy) methane	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dichlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2,4-Trichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Naphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloroaniline	10 U	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10	10 UJ	ug/l	10
Hexachlorobutadiene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloro-3-methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylnaphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorocyclopentadiene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4,6-Trichlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4,5-Trichlorophenol	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25
2-Chloronaphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitroaniline	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25
Dimethylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Acenaphthylene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,6-Dinitrotoluene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
3-Nitroaniline	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25
Acenaphthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrophenol	25 U	ug/l	25	25 UJ	ug/l	25	25 UJ	ug/l	25	25 UJ	ug/l	25
4-Nitrophenol	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25
Dibenzofuran	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrotoluene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Diethylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chlorophenyl-phenylether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Fluorene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Nitroaniline	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25
4,6-Dinitro-2-methylphenol	25 U	ug/l	25	25 U	ug/l	25	25 UJ	ug/l	25	25 UJ	ug/l	25
N-Nitrosodiphenylamine	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Bromophenyl-phenylether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Pentachlorophenol	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25	25 U	ug/l	25
Phenanthrene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Anthracene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Carbazole	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Di-n-butylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10

NAS WHITING FIELD -- SITE 17
 GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10635

Lab Sample Number: Site Locator Collect Date:	90178005 WHITING WHF17-1 19-OCT-93			90180002 WHITING WHF17-1B 20-OCT-93			RB873003 WHITING 17G00101 18-JUL-96			RB873002 WHITING 17G00102 18-JUL-96		
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL
Fluoranthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Pyrene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Butylbenzylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
3,3-Dichlorobenzidine	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzo (a) anthracene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Chrysene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
bis(2-Ethylhexyl) phthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Di-n-octylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzo (b) fluoranthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzo (k) fluoranthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzo (a) pyrene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Indeno (1,2,3-cd) pyrene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Dibenzo (a,h) anthracene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzo (g,h,i) perylene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10635

Lab Sample Number:	90179001			90179002			RB873004			90181001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	WHF17-2B			WHF17-2BA			17G00201			WHF17-3		
Collect Date:	20-OCT-93			20-OCT-93			18-JUL-96			21-OCT-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW												
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	U	ug/l	25	25	U	ug/l	25	25	UJ	ug/l	25
4-Nitrophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 17
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10635

Lab Sample Number: Site Locator Collect Date:	90179001 WHITING WHF17-2B 20-OCT-93	90179002 WHITING WHF17-2BA 20-OCT-93	RB873004 WHITING 17G00201 18-JUL-96	90181001 WHITING WHF17-3 21-OCT-93						
	VALUE QUAL UNITS	DL	VALUE QUAL UNITS	DL	VALUE QUAL UNITS	DL	VALUE QUAL UNITS	DL	VALUE QUAL UNITS	DL
4-Nitroaniline	25 U ug/l	25	25 U ug/l	25	25 U ug/l	25	25 U ug/l	25	25 U ug/l	25
4,6-Dinitro-2-methylphenol	25 U ug/l	25	25 U ug/l	25	25 UJ ug/l	25	25 U ug/l	25	25 U ug/l	25
N-Nitrosodiphenylamine	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
4-Bromophenyl-phenylether	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Hexachlorobenzene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Pentachlorophenol	25 U ug/l	25	25 U ug/l	25	25 U ug/l	25	25 U ug/l	25	25 U ug/l	25
Phenanthrene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Anthracene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Carbazole	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Di-n-butylphthalate	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Fluoranthene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Pyrene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Butylbenzylphthalate	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
3,3-Dichlorobenzidine	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Benzo (a) anthracene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Chrysene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
bis(2-Ethylhexyl) phthalate	10 U ug/l	10	7 J ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Di-n-octylphthalate	10 U ug/l	10	4 J ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Benzo (b) fluoranthene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Benzo (k) fluoranthene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Benzo (a) pyrene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Indeno (1,2,3-cd) pyrene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Dibenzo (a,h) anthracene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10
Benzo (g,h,i) perylene	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10	10 U ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10635

Lab Sample Number: RB873005
 Site WHITING
 Locator 17G00301
 Collect Date: 18-JUL-96

VALUE QUAL UNITS DL

CLP SEMIVOLATILES 90-SOW

Phenol	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10
Iosphorone	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10
Naphthalene	10	U	ug/l	10
4-Chloroaniline	10	UJ	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10
2,4-Dinitrophenol	25	UJ	ug/l	25
4-Nitrophenol	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10
Fluorene	10	U	ug/l	10

NAS WHITING FIELD -- SITE 17
 GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10635

Lab Sample Number: RB873005
 Site WHITING
 Locator 17G00301
 Collect Date: 18-JUL-96

VALUE QUAL UNITS DL

4-Nitroaniline	25	U	ug/l	25
4,6-Dinitro-2-methylphenol	25	UJ	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25
Phenanthrene	10	U	ug/l	10
Anthracene	10	U	ug/l	10
Carbazole	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10
Pyrene	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10
Chrysene	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10636

Lab Sample Number:	90178005			90180002			RB873003			RB873002		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	WHF17-1			WHF17-1B			17G00101			17G00102		
Collect Date:	19-OCT-93			20-OCT-93			18-JUL-96			18-JUL-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW												
alpha-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDE	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDD	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDT	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	UJ	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Toxaphene	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
Aroclor-1016	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1221	2	U	ug/l	2	2	UJ	ug/l	2	2	UJ	ug/l	2
Aroclor-1232	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1242	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1248	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1254	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10636

Lab Sample Number:	90179001	Site	WHITING	Locator	WHF17-2B	Collect Date:	20-OCT-93	90179002	WHITING	RB873004	WHITING	90181001	WHITING
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	Collect Date:
CLP PESTICIDES/PCBS 90-SOW													
alpha-BHC	.05	U	ug/l	.05	.05	J	ug/l	.05	.05	UJ	ug/l	.05	.05
beta-BHC	.017	J	ug/l	.05	.05	J	ug/l	.05	.05	UJ	ug/l	.05	.05
delta-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
Heptachlor	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
Aldrin	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
Endosulfan I	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
Dieldrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
4,4-DDE	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
Endrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
Endosulfan II	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
4,4-DDD	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
4,4-DDT	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
Methoxychlor	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	UJ	ug/l	.5	.5
Endrin ketone	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
Endrin aldehyde	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1
alpha-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
gamma-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05
Toxaphene	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5
Aroclor-1016	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1
Aroclor-1221	2	U	ug/l	2	2	UJ	ug/l	2	2	UJ	ug/l	2	2
Aroclor-1232	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1
Aroclor-1242	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1
Aroclor-1248	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1
Aroclor-1254	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1
Aroclor-1260	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 GROUNDWATER -- PESTICIDES/PCBS -- REPORT NO. 10636

Lab Sample Number: RB873005
 Site WHITING
 Locator 17G00301
 Collect Date: 18-JUL-96

VALUE QUAL UNITS DL

CLP PESTICIDES/PCBS 90-SOW

alpha-BHC	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1
4,4-DDE	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1
4,4-DDD	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1
4,4-DDT	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05
Toxaphene	5	U	ug/l	5
Aroclor-1016	1	U	ug/l	1
Aroclor-1221	2	U	ug/l	2
Aroclor-1232	1	U	ug/l	1
Aroclor-1242	1	U	ug/l	1
Aroclor-1248	1	U	ug/l	1
Aroclor-1254	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE

UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED

R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
GROUNDWATER -- INORGANICS -- REPORT NO. 10637

Lab Sample Number:	90178005			90180002			RB873003			RB873002		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	WHF17-1			WHF17-1B			17G00101			17G00102		
Collect Date:	19-OCT-93			20-OCT-93			18-JUL-96			18-JUL-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW												
alpha-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDE	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDD	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDT	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	UJ	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Toxaphene	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
Aroclor-1016	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1221	2	U	ug/l	2	2	UJ	ug/l	2	2	UJ	ug/l	2
Aroclor-1232	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1242	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1248	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1254	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE

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NAS WHITING FIELD -- SITE 17
GROUNDWATER -- INORGANICS -- REPORT NO. 10637

Lab Sample Number:	90179001			90179002			RB873004			90181001		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	WHF17-2B			WHF17-2B			17G00201			WHF17-3		
Collect Date:	20-OCT-93			20-OCT-93			18-JUL-96			21-OCT-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW												
alpha-BHC	.05	U	ug/l	.05	.05	J	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.017	J	ug/l	.05	.05	J	ug/l	.05	.05	UJ	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDE	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDD	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDT	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	UJ	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Toxaphene	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
Aroclor-1016	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1221	2	U	ug/l	2	2	UJ	ug/l	2	2	UJ	ug/l	2
Aroclor-1232	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1242	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1248	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1254	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1

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R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 17
 GROUNDWATER -- INORGANICS -- REPORT NO. 10637

Lab Sample Number:	RB873005			
Site	WHITING			
Locator	17G00301			
Collect Date:	18-JUL-96			
	VALUE	QUAL	UNITS	DL

CLP PESTICIDES/PCBS 90-SOW

alpha-BHC	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1
4,4-DDE	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1
4,4-DDD	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1
4,4-DDT	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05
Toxaphene	5	U	ug/l	5
Aroclor-1016	1	U	ug/l	1
Aroclor-1221	2	U	ug/l	2
Aroclor-1232	1	U	ug/l	1
Aroclor-1242	1	U	ug/l	1
Aroclor-1248	1	U	ug/l	1
Aroclor-1254	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE

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R= RESULT IS REJECTED AND UNUSABLE

APPENDIX D
HUMAN HEALTH RISK DATA

Table D-1
Surface Soil Screening Concentrations
for Selection of Chemicals of Potential Concern for Site 17

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Risk-Based Screening Concentration ¹	Florida Soil Cleanup Target Level ²	Florida Soil Cleanup Target Level Based on Leaching ³	Selected Screening Concentration ⁴
Volatile Organic Compounds (µg/kg)				
2-Butanone	4,700,000	3,100,000	17,000	3,100,000
Carbon disulfide	20,000,000	200,000	5,600	200,000
Ethylbenzene	20,000,000	1,100,000	600	1,100,000
Methylene chloride	85,000	16,000	20	16,000
Toluene	1,600,000	380,000	500	380,000
Trichloroethene	58,000	6,000	30	6,000
Xylenes (total)	16,000,000	5,900,000	200	5,900,000
Semivolatile Organic Compounds (µg/kg)				
2-Methylnaphthalene	160,000	80,000	6,100	80,000
Butylbenzylphthalate	1,600,000	15,000,000	310,000	1,600,000
Naphthalene	160,000	40,000	1,700	40,000
bis(2-Ethylhexyl)phthalate	46,000	76,000	3,600,000	46,000
Inorganic Analytes (mg/kg)				
Aluminum	7,800	72,000	⁴ SPLP	7,800
Antimony	3.1	26	5	3.1
Arsenic	⁵ 0.43	0.8	29	0.43
Barium	550	110	1,600	105
Beryllium	16	120	63	16
Cadmium	3.9	75	8	3.9
Calcium	⁶ 1,000,000	NSC	NSC	1,000,000
Chromium	⁷ 23	⁷ 210	38	23
Cobalt	470	4,700	⁴ SPLP	470
Copper	310	110	⁴ SPLP	110
Iron	2,300	23,000	⁴ SPLP	2,300
Lead	⁸ 400	400	⁴ SPLP	400
See notes at end of table.				

Table D-1 (Continued)
Surface Soil Screening Concentrations
for Selection of Chemicals of Potential Concern for Site 17

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Risk-Based Screening Concentration ¹	Florida Soil Cleanup Target Level ²	Florida Soil Cleanup Target Level Based on Leaching ³	Selected Screening Concentration ⁴
Inorganic Analytes (mg/kg) (Continued)				
Magnesium	³ 460,468	NSC	NSC	460,468
Manganese	160	1,600	⁴ SPLP	160
Nickel	160	110	130	105
Potassium	⁵ 1,000,000	NSC	NSC	1,000,000
Silver	39	390	5	39
Sodium	⁶ 1,000,000	NSC	NSC	1,000,000
Vanadium	55	15	980	15
Zinc	2,300	23,000	6,000	2,300
Others (mg/kg)				
Total Petroleum Hydrocar	NSC	340	340	340

¹ For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency Region III Risked-Based Concentration (RBC) Table for residential soil (October 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 1×10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.

² Florida Department of Environmental Protection, Chapter 62-777, FAC (FDEP, 1999). Cleanup goals are based on a target cancer risk of 1×10^{-6} or a target hazard quotient of 1.

³ The selected screening concentration for the human health risk assessment is the lowest value of the RBC, and the Florida Soil Cleanup Target Level (SCTL). The Florida SCTL based on leaching was used to select the human health chemical of potential concern only when the analyte was detected in groundwater samples above the groundwater cleanup target level.

⁴ Leachability values may be derived using the SPLP test to calculate site-specific SCTLs or may be determined using toxicity characteristic leaching procedure in the event oily wastes are present.

⁵ RBC value is based on arsenic's as a carcinogen.

⁶ Essential nutrient screening value (see General Information Report).

⁷ RBC and Florida SCTL values are based on Chromium VI.

⁸ RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites OSWER Directive 9355.4-12).

Notes: $\mu\text{g}/\text{kg}$ = micrograms per kilogram.

mg/kg = milligrams per kilogram.

SPLP = synthetic precipitation leaching procedure.

NSC = no screening criteria.

Table D-2
Subsurface Soil Screening Concentrations
for Selection of Chemicals of Potential Concern for Site 17

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Risk-Based Screening Concentration ¹	Florida Soil Cleanup Target Level ²	Florida Soil Cleanup Target Level Based on Leaching ³	Selected Screening Concentration ⁴
<u>Volatile Organic Compounds (µg/kg)</u>				
2-Butanone	120,000,000	21,000,000	17,000	21,000,000
4-Methyl-2-pentanone	16,000,000	1,500,000	2,600	1,500,000
Acetone	20,000,000	5,500,000	2,800	5,500,000
<u>Semivolatile Organic Compounds (µg/kg)</u>				
Di-n-butylphthalate	20,000,000	140,000,000	47,000	20,000,000
Diethylphthalate	160,000,000	920,000,000	41,000	160,000,000
<u>Pesticides (µg/kg)</u>				
4,4'-DDE	17,000	13,000	18,000	13,000
4,4'-DDT	17,000	13,000	11,000	13,000
<u>Inorganic Analytes (mg/kg)</u>				
Aluminum	200,000	--	⁴ SPLP	200,000
Antimony	82	240	5	82
Arsenic	⁵ 3.8	⁵ 3.7	29	3.7
Barium	14,000	87,000	1,600	14,000
Beryllium	410	800	63	410
Cadmium	100	1,300	8	100
Calcium	⁶ 1,000,000	NSC	NSC	1,000,000
Chromium	⁷ 610	⁷ 420	38	420
Cobalt	12,000	110,000	⁴ SPLP	12,000
Copper	8,200	76,000	⁴ SPLP	8,200
Cyanide	4,100	28,000	40	4,100
Iron	61,000	480,000	⁴ SPLP	61,000
Lead	⁸ 400	920	⁴ SPLP	400

See notes at end of table.

Table D-2 (Continued)
Subsurface Soil Screening Concentrations
for Selection of Chemicals of Potential Concern for Site 17

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Risk-Based Screening Concentration ¹	Florida Soil Cleanup Target Level ²	Florida Soil Cleanup Target Level Based on Leaching ³	Selected Screening Concentration ⁴
Inorganic Analytes (mg/kg) (Continued)				
Magnesium	⁵ 460,468	NSC	NSC	460,468
Manganese	4,100	22,000	SPLP ⁴	4,100
Mercury	NSC	26	2.1	26
Nickel	4,100	28,000	130	4,100
Potassium	⁶ 1,000,000	NSC	NSC	1,000,000
Selenium	1,000	10,000	5	1,000
Silver	1,000	9,100	17	1,000
Sodium	⁶ 1,000,000	NSC	NSC	1,000,000
Vanadium	1,400	7,400	980	1,400
Zinc	61,000	560,000	6,000	61,000
Other (mg/kg)				
Total petroleum hydrocarbons	NSC	2,500	340	2,500

¹ For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency Region III Risked-Based Concentration (RBC) Table for industrial soil (October 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 1×10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.

² Florida Department of Environmental Protection, Chapter 62-777, FAC (FDEP, 1999). Cleanup goals are based on a target cancer risk of 1×10^{-6} or a target hazard quotient of 1.

³ The selected screening concentration for the human health risk assessment is the lowest value of the RBC, the Florida industrial soil cleanup target level (SCTL) and the Florida SCTL based on leaching.

⁴ Leachability values may be derived using the SPLP test to calculate site-specific SCTLs or may be determined using toxicity characteristic leaching procedure in the event oily wastes are present.

⁵ RBC value is based on arsenic's as a carcinogen.

⁶ Essential nutrient screening value (see General Information Report).

⁷ RBC and Florida Cleanup Goal values are based on Chromium VI.

⁸ RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).

Notes: $\mu\text{g}/\text{kg}$ = micrograms per kilogram.

DDE = dichlorodiphenyl dichloroethene.

DDT = dichlorodiphenyl trichloroethane.

mg/kg = milligrams per kilogram.

SPLP = synthetic precipitation leaching procedure.

NSC = no screening criteria.

Table D-3
Groundwater Screening Concentrations
for Selection of Chemicals of Potential Concern for Site 17

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Risk-Based Screening Concentration ¹	Federal MCL ²	Florida Groundwater Cleanup Target Levels ³	Selected Screening Concentration ⁴
Volatile Organic Compounds (µg/kg)				
Carbon disulfide	100	NSC	700	100
Inorganic Analytes (mg/kg)				
Aluminum	3,700	(50)	200	50
Barium	260	2,000	2,000	260
Beryllium	733	4	4	4
Calcium	⁶ 1,055,398	NSC	NSC	1,055,398
Chromium	⁸ 11	100	⁸ 100	11
Cobalt	220	NSC	420	220
Copper	150	(1,000)	1,000	150
Cyanide	73	200	200	73
Iron	1,100	(300)	300	300
Lead	NSC	⁷ 15	15	15
Magnesium	⁶ 118,807	NSC	NSC	118,807
Manganese	73	(50)	50	50
Potassium	⁶ 297,016	NSC	NSC	297,016
Sodium	⁶ 396,022	NSC	160,000	160,000
Vanadium	26	NSC	49	26
Zinc	1,100	(5,000)	5,000	1,100

¹ For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency Region III Risked Based Concentration Table for tap water (October 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.

² Federal MCLs are taken from USEPA Drinking Water Regulations and Health Advisories from October 1996. Primary MCLs have no marks, Secondary MCLs are indicated by parentheses (), and Federal maximum contaminant level goals (MCLGs) are indicated by brackets []. The lowest of these nonzero values is presented.

³ Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, Florida Administrative Code (FDEP, 1999).

⁴ The selected screening concentration for the human health risk assessment is the lowest value of the RBC and Federal MCL value, and Florida Target Levels.

⁶ Essential nutrient screening value (see GIR Report).

⁸ RBC value is based on Chromium VI.

⁷ Treatment technology action level for lead in drinking water (USEPA Drinking Water Standards and Health Advisories, October 1996).

Notes: MCL = maximum contaminant level.

µg/l = micrograms per liter.

NSC = no screening criteria.

HUMAN HEALTH TOXICITY PROFILES

Aluminum. Aluminum occurs naturally in the soil and makes up approximately 8 percent of the earth's crust. Higher soil concentrations are associated with industries which burn coal and aluminum mining and smelting. Human exposures to aluminum may occur through ingestion of foods grown in soil that contains aluminum and use of antacids, antiperspirants, and other drug store items. Aluminum in antiperspirants can cause skin rashes in some people. Factory workers who inhale large amounts of aluminum dust may develop lung problems. Aluminum has caused lower birth weights in some animals. Studies have shown that aluminum accumulates in the brains of people with Alzheimer's disease. However, any causal link between aluminum exposure and this disease is yet to be demonstrated. Both human epidemiological studies and animal experiments strongly suggests that aluminum is not a carcinogen.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1989. "Toxicological Profile for Aluminum"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October 1989.

Antimony. Antimony enters the environment during the mining and processing of its ores and other related compounds. Small amounts of antimony are also released into the environment by incinerators and coal burning power plants. Antimony will strongly adhere to soil which contains iron, manganese, or aluminum. Antimony was used for medicinal purposes to treat people infected with parasites. However, chronic exposure can cause eye, skin, and lung irritation, as well as heart problems, vomiting and diarrhea. The oral RfD, based on an oral drinking water study in rats, showed changes in glucose and cholesterol metabolism. Antimony has not been evaluated by the USEPA for evidence of human carcinogenic potential.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1991. "Toxicological Profile for Antimony"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1991.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Arsenic. Arsenic has been used in pesticide formulations and has industrial uses in tanneries, as well as the glass and wine making industries. Toxicity depends on its chemical form. Arsenic is an irritant of the skin, mucous membranes, and gastrointestinal tract. Symptoms of acute toxicity include vomiting, diarrhea, convulsions, and a severe drop in blood pressure. Subchronic effects include hyperpigmentation, sensory-motor polyneuropathy, persistent headache, and lethargy. Chronic oral exposure has caused skin lesions, peripheral vascular disease, and peripheral neuropathy. The USEPA has classified arsenic in Group A, human carcinogen, based on increased incidence of lung cancer in occupational studies.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1992. "Toxicological Profile for Arsenic"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1992.

Barium. Barium is used in paints, soap, paper, rubber, and in the manufacture of glass. Some compounds of barium have been used as insecticides. Acute exposure to barium through ingestion can cause gastroenteritis, muscular paralysis, as well as cardiovascular effects. Chronic inhalation of barium containing dust can cause a reversible, benign pneumoconiosis. There is no evidence for carcinogenicity for barium.

References:

Amdur, Mary O., John Doull, Curtis D. Klaassen, 1991. *Toxicity: The Basic Science of Poisons*, 4th edition; Pergamon Press, Inc. New York.

Cadmium. Cadmium is a naturally occurring element used in metal alloys, electroplating, process engraving, photoelectric cells, and in nickel-cadmium electrical storage batteries. Cadmium enters the environment primarily through industrial effluents and landfill leaching.

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen in two to four days after animals or plants come in contact with a toxic chemical substance.

In fresh waters, cadmium toxicity is influenced by water hardness -- the harder the water, the lower the toxicity. Cadmium has high acute toxicity to aquatic life. No data are available on the short-term effects of cadmium on plants, birds, or land animals.

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Cadmium has high chronic toxicity to aquatic life. No data are available on the long-term effects of cadmium to plants, birds, or land animals.

Cadmium is slightly soluble in water. Concentration of less than 1 milligram will mix with a liter of water.

Cadmium is highly persistent in water, with a half-life of greater than 200 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded.

Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissue and internal organs of animals and humans.

The concentration of cadmium found in fish tissues is expected to be much higher than the average concentration of cadmium in the water from which the fish was taken.

Support Document:

AQUIRE Database, ERL-Duluth, USEPA.

Copper. Copper is a commonly-occurring element in our natural water. At low concentrations, it is an essential element for both plants and animals. At

slightly higher concentrations it is toxic to aquatic life. The toxicity of copper and its compounds to aquatic life varies with the physical and chemical conditions of the water. Factors such as water hardness, alkalinity, and pH influence copper toxicity.

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen in two to four days after animals or plants come in contact with a toxic chemical substance.

Copper and its compounds have high acute toxicity to aquatic life. No data are available on the short-term effects of copper to plants, birds, or land animals.

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Copper and its compounds have high chronic toxicity to aquatic life. No data are available on the long-term effects of cadmium to plants, birds, or land animals.

Copper and its salts are highly soluble in water. Concentration of 1,000 milligram and more will mix with a liter of water.

Copper is highly persistent in water, with a half-life of greater than 200 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded.

Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissue and internal organs of animals and humans.

The concentration of copper found in fish tissues is expected to be considerably higher than the average concentration of copper in the water from which the fish was taken.

Support Document:
AQUIRE Database, ERL-Duluth, USEPA.

Chromium. Chromium is present in minerals predominantly as Cr³⁺. Dissolved chromium may be present as trivalent cations or as anions in which the oxidation state is Cr⁶⁺ (hexavalent). Six different ionic forms of chromium are considered to be stable in aqueous systems. The reduced forms are Cr³⁺, CrOH²⁺, CrOH²⁺, Cr(OH)₂⁺, and Cr(OH)₄⁻. Anionic forms present under oxidizing conditions include dichromate Cr₂O₇²⁻ and chromate CrO₄²⁻. The dissolved forms that predominate in reduced systems between pH 5 and pH 9 probably are CrOH²⁺ and Cr(OH)₂⁺. Concentrations of chromium in natural waters that have not been affected by waste disposal are commonly less than 10 µg/l (Hem, 1992).

Chromium has been used in plating for corrosion resistance and decorative purposes, in the manufacture of alloys, and in printing, dying, and photography. The toxicity of chromium depends upon its valence state. Hexavalent chromium is more toxic than trivalent chromium. The effects of inhalation exposure to hexavalent chromium include ulcers of the upper respiratory tract, nasal inflamma-

tion, perforation of the nasal septa and lung cancer. Most trivalent chromium compounds are inactive in short-term genotoxicity assays. Trivalent chromium compounds have not been found to be carcinogenic by any route of exposure. There is epidemiological evidence of an association between hexavalent chromium inhalation exposure and lung cancer. The USEPA has classified hexavalent chromium as an Class A, human carcinogen, by the inhalation route.

References:

Amdur, Mary O., John Doull, Curtis D. Klaassen, 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Iron. Iron is a metal which is required for a variety of physiological functions such as heme biosynthesis, oxidative phosphorylation and mixed-function oxidase-mediated metabolic reactions. Only divalent forms of iron are absorbed. As absorption occurs, divalent iron is biochemically converted to trivalent iron, the biologically active form. Under normal conditions, absorbed dietary iron is complexed to hemoglobin and transported to the liver for storage until needed for physiological reactions. The balance of iron is regulated only by the amount of dietary intake and the degree of intestinal absorption. Intestinal absorption tends to be low (2 - 15%) except during periods of increased iron need when absorption efficiency increases dramatically.

Acute iron toxicity has been well characterized following the accidental ingestion of iron-containing preparations by children. Shortly after ingestion, the corrosive effects of iron cause vomiting and diarrhea, often bloody. Later signs include shock, metabolic acidosis, seizures, liver and/or kidney failure, coma, and death. Chronic iron overload manifests as disturbances in liver function, diabetes mellitus, and endocrine and cardiovascular effects. Inhalation of iron containing dust or fumes in occupational settings may result in deposition of iron particles in the lungs leading to interstitial fibrosis. Autopsies of hematite miners noted an increase in lung cancer. However, the etiology of the lung cancer may be related to factors other than iron exposure such as cigarette, silica or PAH exposures.

References:

Aisen, P., Cohen, G. and Kang, J.O., 1990. Iron Toxicosis. Int. Rev. Exp. Pathol. 31:1-46.

Goyer, R.A., 1991. Toxic Effects of Metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, 3rd edition. Eds. C.D. Klaassen, M.O. Amdur and J. Doull. Macmillan Publishing Co. N.Y.

TRPH. A toxicity profile was not available for TRPH; therefore, exposure data for jet propellant (JP)-4 and JP-7 have been substituted.

JP-4 and JP-7. Jet fuels JP-4 and JP-7 (jet propellant-4 and jet propellant-7) are flammable, colorless to straw-colored liquid mixtures that come from crude petroleum. They smell like kerosene. Jet fuels are blends of other chemicals made according to U.S. Air Force standards for use as aircraft fuels.

Exposure to JP-4 occurs primarily in workers who manufacture, transport, or use jet fuels. Exposure to JP-4 is most likely to occur through skin contact or breathing contaminated air. You may be exposed to JP-4 by breathing some of the chemicals that evaporate from a spill or leak site. You may also be exposed through drinking or swimming in water that has been contaminated with JP-4, or from touching soil contaminated from a spill or leak. There is no information about how individuals may be exposed to JP-7, but it is reasonable to assume that you could be exposed in the same ways as for JP-4.

Animal testing is sometimes necessary to find out how toxic substances might harm people or to treat those who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

Little information is available about the health effects that may be caused by JP-4 and JP-7. Inhalng large amounts of JP-4 vapor may cause painful breathing and a feeling of suffocation, as well as headache, dizziness, nausea, depression, anxiety, memory loss, and irritability.

Animal studies have shown that inhaling extremely large amounts of JP-4 or JP-7 vapor does not cause death. However, animals breathing high levels of JP-4 vapor for short periods exhibited poor coordination and convulsions. A depressed activity level has been seen in animals breathing low levels of JP-4 vapor. Other effects seen in animals breathing JP-4 or JP-7 vapor have been skin and eye irritation, changes in liver cells, and decreased numbers of white blood cells.

It is not known whether JP-4 or JP-7 can cause birth defects or if they affect reproduction in people.

The International Agency for Research on Cancer (IARC) has stated there is not enough information to determine how likely JP-4 and JP-7 are to cause cancer in humans.

Studies with mice and rats have suggested that skin contact with JP-4 may cause skin cancer, although this is not certain. There is also no clear evidence that breathing, eating, or drinking JP-4 or JP-7 causes cancer in animals.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 500 parts of petroleum distillates per million parts of air (500 ppm) for an 8-hour workday, 40-hour workweek.

The Air Force Office of Safety and Health (AFOSH) has set an exposure limit of 400 ppm petroleum distillates for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m^3) for a 40-hour workweek.

References:

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. "Toxicological Profile for Jet Fuels JP-4 and JP-7." U.S. Department of Health and Human Services, Public Health Service. Atlanta, Georgia.

Vanadium. Vanadium is widely, but sparsely, distributed in the earth's crust and in the environment. It is invaluable as an alloying agent with steel; ferrovanadium alloys are used in high-stress applications such as bearings, jet engines, and cutting tools. Human and animal studies indicate that vanadium is readily absorbed from the lungs and poorly absorbed from the gastrointestinal tract. It distributes primarily to the bone and kidney. Vanadium is a respiratory irritant. Inhalation of vanadium dusts in both animals and occupationally-exposed workers induces mild to moderate respiratory irritation. The effects are reversible and subside when exposure is discontinued. No studies were located regarding cancer in humans or animals following inhalation, oral, or dermal exposures. However, vanadium has been found to induce DNA damage in human cell cultures, suggesting that vanadium may have the potential to be genotoxic to humans.

References:

ATSDR, 1990. Toxicological Profile for Vanadium. Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October, 1990.

Table D-4
Oral Dose-Response Data
for Carcinogenic Effects

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Weight of Evidence	Oral Slope Factor (mg/kg/day)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Inorganic Analytes							
Aluminum	D	NE					
Antimony	D	NE					
Arsenic	A	1.5e +00	IRIS	Human	Oral-drinking water	Skin	IRIS
Cadmium	D	NE					
Chromium	D	NE					
Iron	D	NE					
Vanadium	D	NE					
Other							
Total Recoverable	D	NE					
Petroleum Hydrocarbons							
Notes: IRIS on-line database search, current as of April 1998. Health Effects Assessment Summary, current as of July 1997.							
Weight of Evidence (route-specific): A = Human carcinogen. D = Not classifiable as to human carcinogenicity.							
mg/kg/day = milligrams per kilogram per day. NE = not evaluated. IRIS = integrated risk information system.							

Table D-5
Inhalation Dose-Response Data
for Carcinogenic Effects

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Weight of Evidence	Inhalation Slope Factor (mg/kg/day)(-1)	Source	Inhalation Unit Risk ($\mu\text{g}/\text{m}^3$)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
<u>Inorganic Analytes</u>									
Aluminum	D	NE		NE					
Antimony	D	NE							
Arsenic	A	1.5e +01	IRIS	4.3e-03	IRIS	Human	Inhalation	Lung	IRIS
Cadmium	B1	6.3e +00	IRIS	1.8e-03	IRIS	Human	Inhalation	Lung	IRIS
Chromium	A	4.1e +01	HEAST	1.2e-02	IRIS	Human	Inhalation	Lung	IRIS
Iron	D	NE		NE					
Vanadium	D	NE		NE					
<u>Other</u>									
Total Recoverable Petroleum Hydrocarbons	D	NE		NE					
Notes: IRIS on-line database search, current as of April 1998. HEAST, current as of July 1997.									
Weight of Evidence (route-specific): A = Human carcinogen. B = Probable human carcinogen (B1 = limited human evidence). D = Not classifiable as to human carcinogenicity.									
mg/kg/day = milligrams per kilogram per day. $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter. NE = not evaluated. IRIS = integrated risk information system. HEAST = Health Effects Assessment Summary Tables.									

Table D-6
Dermal Dose-Response Data
for Carcinogenic Effects

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Weight of Evidence	Oral Slope Factor (mg/kg/day)(-1)	Oral Absorption Efficiency	Source/Reference	Dermal Slope Factor (mg/kg-day)-1
Inorganic Analytes					
Aluminum	D	NE			NE
Antimony	D	NE			
Arsenic	A	1.5e +00	98%	Vahter, 1983	1.5e +00
Cadmium	D	NE			
Chromium	D	NE			
Iron	D	NE			NE
Vanadium	D	NE			NE
Other					
Total Recoverable Petroleum Hydrocarbons	D	NE			NE
Notes: For documentation concerning oral slope factors, refer to Table D-4.					
Weight of Evidence (route-specific): A = Human carcinogen. D = Not classifiable as to human carcinogenicity.					
mg/kg-day = milligrams per kilogram per day. NE = not evaluated. % = percent.					

Table D-7
Oral Dose-Response Data
for Noncarcinogenic Effects

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	Oral RfD (mg/kg-day)	Source	Oral RfD (mg/kg-day)	Source						
Inorganic Analytes										
Aluminum	1.0e+00	(1)	ND							
Antimony	4.0e+04	IRIS	4.0e-04	HEAST	Oral-drinking water	Low	Reduced lifespan	Rat	1,000 H,A,L	IRIS
Arsenic	3.0e-04	IRIS	3.0e-04	HEAST	Oral-drinking water	Medium	Hyperpigmentation, keratosis	Human	3 D	IRIS
Cadmium	1.0e-03	IRIS	ND	IRIS	Oral-diet	High	Proteiuria	Human	10 H	IRIS
Chromium	5.0e-03	IRIS	2.0e-02	HEAST	Oral-drinking water	Low	No effects observed	Rat	500 H,A,S	IRIS
Iron	3.0e-01	(1)	ND							
Vanadium	7.0e-03	HEAST	7.0e-03	HEAST	Oral-drinking water	Low	No effects observed	Rat	100 H,A	HEAST
Other										
Total Recoverable Petroleum Hydrocarbons	3.0e-02	IRIS	3.0e-01	HEAST	Oral-gavage	Low	Renal tubular pathology	Mouse	3,000 H,A,S,D	IRIS
(1) This value was provided by the Environmental Criteria and Assessment Office (ECAO) of the U.S. Environmental Protection Agency (USEPA) in response to a specific request.										
(2) Value for pyrene was used as surrogate for total petroleum hydrocarbons.										
Notes: IRIS on-line database search, current as of April 1998. HEAST, current as of July 1997. ECAO of the USEPA in response to a specific request.										
Weight of Evidence (route-specific): A = Animal to human extrapolation. L = Extrapolation from lowest observed adverse effects level to no observable adverse effects level (NOAEL). D = Inadequate data. M = Modifying factor. H = Variation in human sensitivity. S = Extrapolation from subchronic to chronic NOAEL.										
mg/kg-day = milligrams per kilogram per day.					IRIS = Integrated Risk Information System. ND = no data.					
HEAST = Health Effects Assessment Summary Tables.										

Table D-8
Inhalation Dose-Response Data
for Noncarcinogenic Effects

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	RfC ($\mu\text{g}/\text{m}^3$)	Source	RfC ($\mu\text{g}/\text{m}^3$)	Source						
Inorganic Analytes										
Aluminum	ND	ND								
Antimony	ND	ND								
Arsenic	ND	ND								
Cadmium	ND	ND								
Chromium	ND	ND								
Iron	ND	ND								
Vanadium	ND	ND								
Other										
Total Recoverable Petroleum Hydrocarbons	ND	ND								
Notes: RfC = reference concentration. $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter. ND = no data.										

Table D-9
Dermal Dose-Response Data
for Noncarcinogenic Effects

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Chronic Oral RfD (mg/kg-day)	Subchronic Oral RfD (mg/kg-day)	Oral Absorption Efficiency	Reference	Dermal Chronic RfD (mg/kg-day)	Dermal Subchronic RfD (mg/kg-day)
<u>Inorganic Analytes</u>						
Aluminum	1.0e + 00	ND	20%	(2)	2.0e-01	ND
Antimony	4.0e + 04	4.0e + 04	10%	ATSDR, 1991	4.0e-05	4.0e-05
Arsenic	3.0e-04	3.0e-04	98%	Vahter, 1983	2.9e-04	2.9e-04
Cadmium	1.0e-03	ND	20%	USEPA, 1995	2.0e-04	ND
Chromium	5.0e-03	2.0e-02	11%	Ogawa, 1976	5.5e-04	2.2e-03
Iron	3.0e-01	ND	2%	Goyer, 1991	6.0e-03	ND
Vanadium	7.0e-03	7.0e-03	3%	ATSDR, 1991d	2.1e-04	2.1e-04
<u>Other</u>						
Total Recoverable Petroleum Hydrocarbons	3.0e-02	3.0e-01	91%	(1)	2.7e-02	2.7e-01
(1) The oral absorption efficiency of all polynuclear aromatic hydrocarbons is assumed to be identical to that of benzo(a)pyrene, based on structural analogy.						
(2) Inorganics lacking specific information on absorption efficiency are assigned a default value of 20% (USEPA Region IV, 1993).						
Notes: RfD = reference dose. mg/kg-day = milligrams per kilogram per day. ND = no data. % = percent. ATSDR = Agency for Toxic Substances and Disease Registry. USEPA = U.S. Environmental Protection Agency.						

TABLE D-10

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
SITE 17
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE	EQUATIONS
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	USEPA, 1991	CANCER RISK = $\text{INTAKE} (\text{mg/kg-day}) \times \text{CANCER SLOPE FACTOR} (\text{mg/kg-day})^{-1}$
INGESTION RATE	IR	100	mg/day	USEPA, 1991	
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995	HAZARD QUOTIENT = $\text{INTAKE} (\text{mg/kg-day}) / \text{REFERENCE DOSE} (\text{mg/kg-day})$
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1995	
ABSORPTION FRACTION	ABS _d	chemical specific	unitless	USEPA, 1995	
SURFACE AREA EXPOSED	SA	5,750	cm ²	USEPA, 1992	
DOSE ABSORBED PER EVENT	DA _{event}	chemical specific	mg/cm ² -event	USEPA, 1992	
CONVERSION FACTOR	CF	1.00E-06	kg/mg	inorganics	
	CF	1.00E-09	kg/ug	organics	
BODY WEIGHT	BW	70	kg	USEPA, 1991	INTAKE _{INGESTION} = $\frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption	
EXPOSURE DURATION	ED	20	years	Assumption	INTAKE _{DERMAL} = $\frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$
AVERAGING TIME					
CANCER	AT	70	years	USEPA, 1991	Where: $\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS}_d \times \text{CF}$
NONCANCER	AT	20	years	Assumption	Note: For noncarcinogenic effects: AT = ED

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

TABLE D-10

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
SITE 17
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ⁻¹	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ⁻¹	CANCER RISK DERMAL	TOTAL CANCER RISK				
Arsenic	I	2.8	mg/kg	1.4E-07	1.5E+00	2.1E-07	0.001	8.1E-09	0.0E+00	1.2E-08	2.2E-07				
SUMMARY CANCER RISK						2E-07					1E-08	2E-07			
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).															
[2] Calculated from oral CSFs.															

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT				
Aluminum	I	17000	mg/kg	3.0E-03	1.0E+00	3.0E-03	0.001	1.7E-04	2.0E-01	8.6E-04	3.9E-03				
Antimony	I	2	mg/kg	3.5E-07	4.0E-04	8.8E-04	0.001	2.0E-08	4.0E-05	5.1E-04	1.4E-03				
Arsenic	I	2.8	mg/kg	4.9E-07	3.0E-04	1.6E-03	0.001	2.8E-08	2.9E-04	9.8E-05	1.7E-03				
Cadmium	I	3.7	mg/kg	6.5E-07	1.0E-03	6.5E-04	0.01	3.7E-07	2.0E-04	1.9E-03	2.5E-03				
Chromium	I	25.5	mg/kg	4.5E-06	5.0E-03	9.0E-04	0.001	2.6E-07	5.5E-04	4.7E-04	1.4E-03				
Iron	I	9510	mg/kg	1.7E-03	3.0E-01	5.6E-03	0.001	9.6E-05	6.0E-03	1.6E-02	2.2E-02				
Vanadium	I	25	mg/kg	4.4E-06	7.0E-03	6.3E-04	0.001	2.5E-07	2.0E-04	1.3E-03	1.9E-03				
Total Petroleum Hydrocarbons	O	19300000	ug/kg	3.4E-03	3.0E-02	1.1E-01	0.01	2.0E-03	2.7E-02	7.2E-02	1.9E-01				
SUMMARY HAZARD INDEX						0.1					0.09	0.2			
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).															
[2] Calculated from oral RfDs.															

TABLE D-11

INHALATION OF PARTICULATES - SURFACE SOIL
 ADULT TRESPASSER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m ³ /kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m ³	
INHALATION RATE	IR	0.833	m ³ /hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{INHALATION CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{INHALATION REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE} = \frac{\text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{CA} = \text{C} \times \text{CF} \times (1/\text{PEF})$$

Note:

For noncarcinogenic effects, AT = ED

TABLE D-11

INHALATION OF PARTICULATES - SURFACE SOIL
 ADULT TRESPASSER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day) ⁻¹	CANCER RISK
Arsenic	I	2.8	mg/kg	2.26E-09	3.8E-12	1.5E+01	5.7E-11
Cadmium	I	3.7	mg/kg	2.98E-09	5.0E-12	6.3E+00	3.2E-11
Chromium	I	25.5	mg/kg	2.06E-08	3.4E-11	4.1E+01	1.4E-09
SUMMARY CANCER RISK							2E-09

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	1.37E-05	8.0E-08	ND	
Antimony	I	2	mg/kg	1.61E-09	9.5E-12	ND	
Arsenic	I	2.8	mg/kg	2.26E-09	1.3E-11	ND	
Cadmium	I	3.7	mg/kg	2.98E-09	1.8E-11	ND	
Chromium	I	25.5	mg/kg	2.06E-08	1.2E-10	ND	
Iron	I	9510	mg/kg	7.67E-06	4.5E-08	ND	
Vanadium	I	25	mg/kg	2.02E-08	1.2E-10	ND	
Total Petroleum Hydrocarbons	O	19300000	ug/kg	1.56E-05	9.1E-08	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE D-12

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 ADOLESCENT TRESPASSER
 SITE 17
 MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA _i	age-specific	cm ²	USEPA, 1989
ABSORPTION FRACTION	ABS _d	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganics
	CF	1.00E-09	kg/mg	Organics
BODY WEIGHT	BW	45	kg	USEPA, 1995
AGE-SPECIFIC BODY WEIGHT	BW _i	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED _i	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	SA _{soil/adj}	1013	cm ² -year/kg	Per USEPA, 1992
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	Per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.

[2] In estimating the dermally absorbed dose for children age 7 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 10 age periods, age 7 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^1$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_\text{INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_\text{DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:
 $\text{SA}_{\text{soil/adj}} = \text{SUM } (\text{SA}_i \times \text{ED}_i / \text{BW})$
 $\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS}_d \times \text{CF}$

Note: For noncarcinogenic effects: AT = ED.

TABLE D-12

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 ADOLESCENT TRESPASSER
 SITE 17
 MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg day) ¹	ORAL CSF (mg/kg day) ¹	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg day)	DERMAL CSF [2] (mg/kg day) ¹	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	2.8	mg/kg	1.1E-07	1.5E+00	1.6E-07	0.001	5.0E-09	1.5E+00	7.5E-09	1.7E-07
SUMMARY CANCER RISK											
						2E-07				7E-09	2E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).

[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg day)	DERMAL RfD [2] (mg/kg day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT	
Aluminum	I	17000	mg/kg		4.7E-03	1.0E+00	4.7E-03	0.001	2.1E-04	2.0E-01	1.1E-03	5.7E-03
Antimony	I	2	mg/kg		5.5E-07	4.0E-04	1.4E-03	0.001	2.5E-08	4.0E-05	6.2E-04	2.0E-03
Arsenic	I	2.8	mg/kg		7.7E-07	3.0E-04	2.6E-03	0.001	3.5E-08	2.9E-04	1.2E-04	2.7E-03
Cadmium	I	3.7	mg/kg		1.0E-06	1.0E-03	1.0E-03	0.01	4.6E-07	2.0E-04	2.3E-03	3.3E-03
Chromium	I	25.5	mg/kg		7.0E-06	5.0E-03	1.4E-03	0.001	3.2E-07	5.5E-04	5.8E-04	2.0E-03
Iron	I	9510	mg/kg		2.6E-03	3.0E-01	8.7E-03	0.001	1.2E-04	6.0E-03	2.0E-02	2.8E-02
Vanadium	I	25	mg/kg		6.8E-06	7.0E-03	9.8E-04	0.001	3.1E-07	2.0E-04	1.6E-03	2.5E-03
Total Petroleum Hydrocarbons	O	19300000	ug/kg		5.3E-03	3.0E-02	1.8E-01	0.01	2.4E-03	2.7E-02	8.9E-02	2.7E-01
SUMMARY HAZARD INDEX												
							0.2			0.1	0.3	

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).

[2] Calculated from oral RfDs.

TABLE D-13

INHALATION OF PARTICULATES - SURFACE SOIL
 ADOLESCENT TRESPASSER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m ³ /kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m ³	
INHALATION RATE	IR	0.625	m ³ /hour	USEPA, 1995
BODY WEIGHT	BW	45	kg	USEPA, 1995
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA 1995. Supplemental Guidance to RAGS, Region 4 Bulletins, Bulletin No. 3, November 1995.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{INHALATION CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{INHALATION REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE} = \frac{\text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{CA} \approx \text{C} \times \text{CF} \times (1/\text{PEF})$$

Note:

For noncarcinogenic effects: AT = ED

TABLE D-13

INHALATION OF PARTICULATES - SURFACE SOIL
 ADOLESCENT TRESPASSER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day) ⁻¹	CANCER RISK
Arsenic	I	2.8	mg/kg	2.26E-09	2.2E-12	1.5E+01	3.3E-11
Cadmium	I	3.7	mg/kg	2.98E-09	2.9E-12	6.3E+00	1.8E-11
Chromium	I	25.5	mg/kg	2.06E-08	2.0E-11	4.1E+01	8.2E-10
SUMMARY CANCER RISK							9E-10

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	1.37E-05	9.4E-08	ND	
Antimony	I	2	mg/kg	1.61E-09	1.1E-11	ND	
Arsenic	I	2.8	mg/kg	2.26E-09	1.5E-11	ND	
Cadmium	I	3.7	mg/kg	2.98E-09	2.0E-11	ND	
Chromium	I	25.5	mg/kg	2.06E-08	1.4E-10	ND	
Iron	I	9510	mg/kg	7.67E-06	5.3E-08	ND	
Vanadium	I	25	mg/kg	2.02E-08	1.4E-10	ND	
Total Petroleum Hydrocarbons	O	19300000	ug/kg	1.56E-05	1.1E-07	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE D-14

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 ADULT RESIDENT
 SITE 17
 MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1995
ABSORPTION FRACTION	ABS _d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm ²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year [1]	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME	AT	70	years	USEPA, 1991
CANCER	AT	24	years	USEPA, 1995
NONCANCER	AT			

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";

OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/R-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE-INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CE} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS}_d \times \text{CF}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE D-14

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 ADULT RESIDENT
 SITE 17
 MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ^[1]	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ^[1]	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	2.8	mg/kg	1.3E-06	1.5E+00	2.0E-06	0.001	7.6E-08	1.5E+00	1.1E-07	2.1E-06
SUMMARY CANCER RISK						2E-06				1E-07	2E-06
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995). [2] Calculated from oral CSFs.											

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	2.3E-02	1.0E+00	2.3E-02	0.001	1.3E-03	2.0E-01	6.7E-03	3.0E-02
Antimony	I	2	mg/kg	2.7E-06	4.0E-04	6.8E-03	0.001	1.6E-07	4.0E-05	3.9E-03	1.1E-02
Arsenic	I	2.8	mg/kg	3.8E-06	3.0E-04	1.3E-02	0.001	2.2E-07	2.9E-04	7.6E-04	1.4E-02
Cadmium	I	3.7	mg/kg	5.1E-06	1.0E-03	5.1E-03	0.01	2.9E-06	2.0E-04	1.5E-02	2.0E-02
Chromium	I	25.5	mg/kg	3.5E-05	5.0E-03	7.0E-03	0.001	2.0E-06	5.5E-04	3.7E-03	1.1E-02
Iron	I	9510	mg/kg	1.3E-02	3.0E-01	4.3E-02	0.001	7.5E-04	6.0E-03	1.2E-01	1.7E-01
Vanadium	I	25	mg/kg	3.4E-05	7.0E-03	4.9E-03	0.001	2.0E-06	2.0E-04	9.8E-03	1.5E-02
Total Petroleum Hydrocarbons	O	19300000	ug/kg	2.6E-02	3.0E-02	8.8E-01	0.01	1.5E-02	2.7E-02	5.6E-01	1.4E+00
SUMMARY HAZARD INDEX						1.0				0.7	2
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995). [2] Calculated from oral RfDs.											

TABLE D-15

INHALATION OF PARTICULATES - SURFACE SOIL
 ADULT RESIDENT
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m³/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m³	
INHALATION RATE	IR	0.833	m³/hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	16	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day)⁻¹

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

INTAKE = $\frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$

Where:

CA = $C \times CF \times (1/PEF)$

Note:
For noncarcinogenic effects: AT = ED

TABLE D-15

INHALATION OF PARTICULATES - SURFACE SOIL
 ADULT RESIDENT
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Arsenic	I		2.8 mg/kg	2.26E-09	1.4E-10	1.5E+01	2.1E-09
Cadmium	I		3.7 mg/kg	2.98E-09	1.9E-10	6.3E+00	1.2E-09
Chromium	I		25.5 mg/kg	2.06E-08	1.3E-09	4.1E+01	5.3E-08
SUMMARY CANCER RISK							6E-08

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RFID (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I		17000 mg/kg	1.37E-05	2.5E-06	ND	
Antimony	I		2 mg/kg	1.61E-09	2.9E-10	ND	
Arsenic	I		2.8 mg/kg	2.26E-09	4.1E-10	ND	
Cadmium	I		3.7 mg/kg	2.98E-09	5.4E-10	ND	
Chromium	I		25.5 mg/kg	2.06E-08	3.8E-09	ND	
Iron	I		9510 mg/kg	7.67E-06	1.4E-06	ND	
Vanadium	I		25 mg/kg	2.02E-08	3.7E-09	ND	
Total Petroleum Hydrocarbons	O		19300000 ug/kg	1.56E-05	2.8E-06	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE D-16

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 CHILD RESIDENT
 SITE 17
 MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm ²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	SA _{adj}	766	cm ² -year/kg	USEPA, 1992
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
 [2] In estimating the dermally absorbed dose for children age 1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.
 USEPA, 1989. Exposure Factors Handbook; EPA/600/R-89/043; May 1989.
 USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
 USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/R-91/011B; January 1992.
 USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_\text{INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_\text{DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{SA}_{\text{adj}} = \text{SUM} (\text{SA} \times \text{ED} / \text{BW})$$

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS} \times \text{CF}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE D-16

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 CHILD RESIDENT
 SITE 17
 MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ⁻¹	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ⁻¹	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	2.8	mg/kg	3.1E-06	1.5E+00	4.6E-06	0.001	2.9E-08	1.5E+00	4.4E-08	4.6E-06
SUMMARY CANCER RISK						5E-06					
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995). [2] Calculated from oral CSFs.											

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	17000	mg/kg		2.2E-01	1.0E+00	2.2E-01	0.001	2.1E-03	2.0E-01	1.0E-02
Antimony	I	2	mg/kg		2.6E-05	4.0E-04	6.4E-02	0.001	2.4E-07	4.0E-05	6.1E-03
Arsenic	I	2.8	mg/kg		3.6E-05	3.0E-04	1.2E-01	0.001	3.4E-07	2.9E-04	1.2E-03
Cadmium	I	3.7	mg/kg		4.7E-05	1.0E-03	4.7E-02	0.01	4.5E-06	2.0E-04	2.3E-02
Chromium	I	25.5	mg/kg		3.3E-04	5.0E-03	6.5E-02	0.001	3.1E-06	5.5E-04	5.7E-03
Iron	I	9510	mg/kg		1.2E-01	3.0E-01	4.1E-01	0.001	1.2E-03	6.0E-03	1.9E-01
Vanadium	I	25	mg/kg		3.2E-04	7.0E-03	4.6E-02	0.001	3.1E-06	2.0E-04	1.5E-02
Total Petroleum Hydrocarbons	O	19300000	ug/kg		2.5E-01	3.0E-02	8.2E+00	0.01	2.4E-02	2.7E-02	8.8E-01
SUMMARY HAZARD INDEX						9					
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995). [2] Calculated from oral RfDs.											

TABLE D-17

INHALATION OF PARTICULATES - SURFACE SOIL
 CHILD RESIDENT
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m ³ /kg	default [1]
CONCENTRATION IN AIR	CA	chemical-specific	mg/m ³	
INHALATION RATE	IR	0.625	m ³ /hour	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
EXPOSURE TIME	ET	24	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	6	years	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day)⁻¹

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

INTAKE = $\frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$

Where:

CA = C x CF x (1/PEF)

Note:

For noncarcinogenic effects: AT = ED

TABLE D-17

INHALATION OF PARTICULATES - SURFACE SOIL
 CHILD RESIDENT
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Arsenic	I	2.8	mg/kg	2.26E-09	1.9E-10	1.5E+01	2.8E-09
Cadmium	I	3.7	mg/kg	2.98E-09	2.5E-10	6.3E+00	1.5E-09
Chromium	I	25.5	mg/kg	2.06E-08	1.7E-09	4.1E+01	6.9E-08
SUMMARY CANCER RISK							7E-08

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RID (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	1.37E-05	1.3E-05	ND	
Antimony	I	2	mg/kg	1.61E-09	1.5E-09	ND	
Arsenic	I	2.8	mg/kg	2.26E-09	2.2E-09	ND	
Cadmium	I	3.7	mg/kg	2.98E-09	2.9E-09	ND	
Chromium	I	25.5	mg/kg	2.06E-08	2.0E-08	ND	
Iron	I	9510	mg/kg	7.67E-06	7.4E-06	ND	
Vanadium	I	25	mg/kg	2.02E-08	1.9E-08	ND	
Total Petroleum Hydrocarbons	O	19300000	ug/kg	1.56E-05	1.5E-05	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE D-18

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 SITE MAINTENANCE WORKER
 SITE 17
 MILTON, FLORIDA

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	5,750	cm ²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";

OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE-INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS} \times \text{CF}$$

Note:

For noncarcinogenic effects, AT ≈ ED

TABLE D-18

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 SITE MAINTENANCE WORKER
 SITE 17
 MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ⁻¹	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ⁻¹	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	2.8	mg/kg	5.9E-08	1.5E+00	8.8E-08	0.001	6.8E-09	1.5E+00	1.0E-08	9.8E-08
SUMMARY CANCER RISK						9E-08				1E-08	1E-07
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).											
[2] Calculated from oral CSFs.											

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	1.0E-03	1.0E+00	1.0E-03	0.001	1.1E-04	2.0E-01	5.7E-04	1.6E-03
Antimony	I	2	mg/kg	1.2E-07	4.0E-04	2.9E-04	0.001	1.4E-08	4.0E-05	3.4E-04	6.3E-04
Arsenic	I	2.8	mg/kg	1.6E-07	3.0E-04	5.5E-04	0.001	1.9E-08	2.9E-04	6.5E-05	6.1E-04
Cadmium	I	3.7	mg/kg	2.2E-07	1.0E-03	2.2E-04	0.01	2.5E-07	2.0E-04	1.2E-03	1.5E-03
Chromium	I	25.5	mg/kg	1.5E-06	5.0E-03	3.0E-04	0.001	1.7E-07	5.5E-04	3.1E-04	6.1E-04
Iron	I	9510	mg/kg	5.6E-04	3.0E-01	1.9E-03	0.001	6.4E-05	6.0E-03	1.1E-02	1.3E-02
Vanadium	I	25	mg/kg	1.5E-06	7.0E-03	2.1E-04	0.001	1.7E-07	2.0E-04	8.4E-04	1.1E-03
Total Petroleum Hydrocarbons	O	19300000	ug/kg	1.1E-03	3.0E-02	3.8E-02	0.01	1.3E-03	2.7E-02	4.8E-02	8.6E-02
SUMMARY HAZARD INDEX						0.04				0.06	0.1
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).											
[2] Calculated from oral RfDs.											

TABLE D-19

INHALATION OF PARTICULATES - SURFACE SOIL
 SITE MAINTENANCE WORKER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m³/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m³	
INHALATION RATE	IR	2.5	m³/hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME	AT	70	years	USEPA, 1991
CANCER	AT	25	years	USEPA, 1995
NONCANCER				

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:

"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{INHALATION CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{INHALATION REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE} = \frac{\text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{CA} = \text{C} \times \text{CF} \times (1/\text{PEF})$$

Note:

For noncarcinogenic effects, AT = ED

TABLE D-19

INHALATION OF PARTICULATES - SURFACE SOIL
 SITE MAINTENANCE WORKER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day) ⁻¹	CANCER RISK
Arsenic	I	2.8	mg/kg	2.26E-09	1.9E-11	1.5E+01	2.8E-10
Cadmium	I	3.7	mg/kg	2.98E-09	2.5E-11	6.3E+00	1.6E-10
Chromium	I	25.5	mg/kg	2.06E-08	1.7E-10	4.1E+01	7.1E-09
SUMMARY CANCER RISK							8E-09

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RFID (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	1.37E-05	3.2E-07	ND	
Antimony	I	2	mg/kg	1.61E-09	3.8E-11	ND	
Arsenic	I	2.8	mg/kg	2.26E-09	5.3E-11	ND	
Cadmium	I	3.7	mg/kg	2.98E-09	7.0E-11	ND	
Chromium	I	25.5	mg/kg	2.06E-08	4.8E-10	ND	
Iron	I	9510	mg/kg	7.67E-06	1.8E-07	ND	
Vanadium	I	25	mg/kg	2.02E-08	4.7E-10	ND	
Total Petroleum Hydrocarbo	O	19300000	ug/kg	1.56E-05	3.7E-07	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE D-20

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 OCCUPATIONAL WORKER
 SITE 17
 MILTON, FLORIDA

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,300	cm ²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME	AT	70	years	USEPA, 1991
CANCER	AT	25	years	USEPA, 1995
NONCANCER	AT			

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
 USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors",
 OSWER Directive 9285.6-03.
 USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.
 USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^1$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS} \times \text{CF}$$

Note: For noncarcinogenic effects, AT = ED

TABLE D-20

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 OCCUPATIONAL WORKER
 SITE 17
 MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ⁻¹	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ⁻¹	CANCER RISK DERMAL	TOTAL CANCER RISK	
Arsenic	I	2.8	mg/kg	4.9E-07	1.5E+00	7.3E-07	0.001	2.3E-08	1.5E+00	3.4E-08	7.7E-07	
SUMMARY CANCER RISK						7E-07						
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).												
[2] Calculated from oral CSFs.												

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT	
Aluminum	I	17000	mg/kg	8.3E-03	1.0E+00	8.3E-03	0.001	3.8E-04	2.0E-01	1.9E-03	1.0E-02	
Antimony	I	2	mg/kg	9.8E-07	4.0E-04	2.4E-03	0.001	4.5E-08	4.0E-05	1.1E-03	3.6E-03	
Arsenic	I	2.8	mg/kg	1.4E-06	3.0E-04	4.6E-03	0.001	6.3E-08	2.9E-04	2.2E-04	4.8E-03	
Cadmium	I	3.7	mg/kg	1.8E-06	1.0E-03	1.8E-03	0.01	8.3E-07	2.0E-04	4.2E-03	6.0E-03	
Chromium	I	25.5	mg/kg	1.2E-05	5.0E-03	2.5E-03	0.001	5.7E-07	5.5E-04	1.0E-03	3.5E-03	
Iron	I	9510	mg/kg	4.7E-03	3.0E-01	1.6E-02	0.001	2.1E-04	6.0E-03	3.6E-02	5.1E-02	
Vanadium	I	25	mg/kg	1.2E-05	7.0E-03	1.7E-03	0.001	5.6E-07	2.0E-04	2.8E-03	4.6E-03	
Total Petroleum Hydrocarbons	O	19300000	ug/kg	9.4E-03	3.0E-02	3.1E-01	0.01	4.3E-03	2.7E-02	1.6E-01	4.8E-01	
SUMMARY HAZARD INDEX						0.4						
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).												
[2] Calculated from oral RfDs.												

TABLE D-21

INHALATION OF PARTICULATES - SURFACE SOIL
 OCCUPATIONAL WORKER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m ³ /kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m ³	
INHALATION RATE	IR	0.833	m ³ /hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	250	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:

"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAOS: Region 4 Bulletins, Bulletin No. 3, November 1995.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{INHALATION CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{INHALATION REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE} = \frac{\text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{CA} = \text{C} \times \text{CF} \times (1/\text{PEF})$$

Note:

For noncarcinogenic effects, AT = ED.

TABLE D-21

INHALATION OF PARTICULATES - SURFACE SOIL
 OCCUPATIONAL WORKER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day) ⁻¹	CANCER RISK
Arsenic	I	2.8	mg/kg	2.26E-09	5.3E-11	1.5E+01	7.9E-10
Cadmium	I	3.7	mg/kg	2.98E-09	6.9E-11	6.3E+00	4.4E-10
Chromium	I	25.5	mg/kg	2.06E-08	4.8E-10	4.1E+01	2.0E-08
SUMMARY CANCER RISK							2E-08

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	1.37E-05	8.9E-07	ND	
Antimony	I	2	mg/kg	1.61E-09	1.1E-10	ND	
Arsenic	I	2.8	mg/kg	2.26E-09	1.5E-10	ND	
Cadmium	I	3.7	mg/kg	2.98E-09	1.9E-10	ND	
Chromium	I	25.5	mg/kg	2.06E-08	1.3E-09	ND	
Iron	I	9510	mg/kg	7.67E-06	5.0E-07	ND	
Vanadium	I	25	mg/kg	2.02E-08	1.3E-09	ND	
Total Petroleum Hydrocarbo	O	19300000	ug/kg	1.56E-05	1.0E-06	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE D-22

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 EXCAVATION WORKER
 SITE 17
 MILTON, FLORIDA

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm ²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	1	years	USEPA, 1991
AVERAGING TIME	AT	70	years	USEPA, 1991
CANCER	AT	1	years	USEPA, 1991
NONCANCER	AT			

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";

OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/R-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE-INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EE} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS} \times \text{CF}$$

Note:

For noncarcinogenic effects, AT = ED

TABLE D-22

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
SITE 17
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ^[1]	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ^[1]	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	2.8	mg/kg	2.3E-08	1.5E+00	3.4E-08	0.001	2.7E-10	1.5E+00	4.1E-10	3.4E-08
SUMMARY CANCER RISK						3E-08				4E-10	3E-08
<small>[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995). [2] Calculated from oral CSFs.</small>											

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD [1] (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [3] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	9.6E-03	1.0E+00	9.6E-03	0.001	1.1E-04	2.0E-01	5.7E-04	1.0E-02
Antimony	I	2	mg/kg	1.1E-06	4.0E-04	2.8E-03	0.001	1.4E-08	4.0E-05	3.4E-04	3.2E-03
Arsenic	I	2.8	mg/kg	1.6E-06	3.0E-04	5.3E-03	0.001	1.9E-08	2.9E-04	6.5E-05	5.3E-03
Cadmium	I	3.7	mg/kg	2.1E-06	1.0E-03	2.1E-03	0.01	2.5E-07	2.0E-04	1.2E-03	3.3E-03
Chromium	I	25.5	mg/kg	1.4E-05	5.0E-03	2.9E-03	0.001	1.7E-07	5.5E-04	3.1E-04	3.2E-03
Iron	I	9510	mg/kg	5.4E-03	3.0E-01	1.8E-02	0.001	6.4E-05	6.0E-03	1.1E-02	2.9E-02
Vanadium	I	25	mg/kg	1.4E-05	7.0E-03	2.0E-03	0.001	1.7E-07	2.0E-04	8.4E-04	2.9E-03
Total Petroleum Hydrocarbons	O	19300000	ug/kg	1.1E-02	3.0E-02	3.6E-01	0.01	1.3E-03	2.7E-02	4.8E-02	4.1E-01
SUMMARY HAZARD INDEX						0.4				0.06	0.5
<small>[1] Subchronic RfD values were used for the excavation worker due to short exposure scenario. [2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (USEPA, 1995). [3] Calculated from oral RfDs.</small>											

TABLE D-23

**INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 17**

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m³/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m³	
INHALATION RATE	IR	2.5	m³/hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	1	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME	AT	70	years	USEPA, 1991
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV. Human Health Risk Assessment Bulletin No. 3.

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day)⁻¹

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

INTAKE = CA x IR x ET x EF x ED
BW x AT x 365 days/yr

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogens, AT = ED.

Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance.

Standard Default Exposure Factors; OSWER Directive 9285.6-03.

USEPA. 1995. Supplemental Guidance to RAGS : Region IV. Human Health Risk Assessment Bulletin No. 3.

TABLE D-23

INHALATION OF PARTICULATES - SURFACE SOIL
 EXCAVATION WORKER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day) ⁻¹	CANCER RISK
Arsenic	I	2.8	mg/kg	2.26E-09	7.6E-13	1.5E+01	1.1E-11
Cadmium	I	3.7	mg/kg	2.98E-09	1.0E-12	6.3E+00	6.3E-12
Chromium	I	25.5	mg/kg	2.06E-08	6.9E-12	4.1E+01	2.8E-10
SUMMARY CANCER RISK							3E-10

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	1.37E-05	3.2E-07	ND	
Antimony	I	2	mg/kg	1.61E-09	3.8E-11	ND	
Arsenic	I	2.8	mg/kg	2.26E-09	5.3E-11	ND	
Cadmium	I	3.7	mg/kg	2.98E-09	7.0E-11	ND	
Chromium	I	25.5	mg/kg	2.06E-08	4.8E-10	ND	
Iron	I	9510	mg/kg	7.67E-06	1.8E-07	ND	
Vanadium	I	25	mg/kg	2.02E-08	4.7E-10	ND	
Total Petroleum Hydrocarbo	O	19300000	ug/kg	1.56E-05	3.7E-07	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE D-24

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
 EXCAVATION WORKER
 NAS WHITING FIELD
 MILTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm ² -event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm ²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	1	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";

OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE-INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EE} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS} \times \text{CF}$$

Note: For noncarcinogenic effects, AT = ED

TABLE D-24

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ^[1]	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ^[1]	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	5.3	mg/kg	4.3E-08	1.5E+00	6.4E-08	0.001	5.1E-10	1.5E+00	7.7E-10	6.5E-08
SUMMARY CANCER RISK						6E-08				8E-10	6E-08

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).

[2] Calculated from oral CSFs.

NE = not evaluated.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	I	5.3	mg/kg	3.0E-06	3.0E-04	1.0E-02	0.001	3.6E-08	2.9E-04	1.2E-04	1.0E-02
Iron	I	47600	mg/kg	2.7E-02	3.0E-01	8.9E-02	0.001	3.2E-04	6.0E-03	5.4E-02	1.4E-01
SUMMARY HAZARD INDEX						0.1				0.05	0.2

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).

[2] Calculated from oral RfDs.

ND = no data available.

TABLE D-25

INHALATION OF PARTICULATES - SUBSURFACE SOIL
 EXCAVATION WORKER
 NAS WHITING FIELD
 MELTON, FLORIDA
 SITE 17

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE	
SOIL CONCENTRATION	C	chemical-specific	chemical-specific		
PART. EMISSION FACTOR	PEF	12000000	m ³ /kg	#REF!	
CONCENTRATION AIR	CA	chemical-specific	mg/m ³		
INHALATION RATE	IR	2.5	m ³ /hour	USEPA, 1995	
BODY WEIGHT	BW	70	kg	USEPA, 1991	
EXPOSURE TIME	ET	8	hours/day	Assumption	
EXPOSURE FREQUENCY	EF	30	days/year	Assumption	
EXPOSURE DURATION	ED	1	years	Assumption	
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only	
AVERAGING TIME					
CANCER	AT	70	years	USEPA, 1991	
NONCANCER	AT	1	years	USEPA, 1991	

[1] PEF has been derived in the PEF Appendix to this report.
 USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
 Standard Default Exposure Factors; OSWER Directive 9285.6-03.
 USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{INHALATION CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{INHALATION REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE} = \frac{\text{CA} \times \text{IR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{CA} \approx \text{C} \times \text{CF} \times (1/\text{PEF})$$

Note: For noncarcinogens, AT = ED.

TABLE D-25

INHALATION OF PARTICULATES - SUBSURFACE SOIL
 EXCAVATION WORKER
 NAS WHITING FIELD
 MELTON, FLORIDA
 SITE 17

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day) ⁻¹	CANCER RISK
Arsenic	I	5.3	mg/kg	4.42E-07	1.5E-10	1.5E+01	2.2E-09
SUMMARY CANCER RISK							2E-09

NB = not evaluated.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m ³)	INTAKE (mg/kg-day)	INHALATION RID (mg/kg-day)	HAZARD QUOTIENT
Arsenic	I	5.3	mg/kg	4.42E-07	1.0E-08	ND	
Iron	I	47600	mg/kg	3.97E-03	9.3E-05	ND	
SUMMARY HAZARD INDEX							0E+00

ND = no data available.

TABLE D-26

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)

ADULT RESIDENT

SITE 17

MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance.
 "Standard Default Exposure Factors", OSWER Directive 9285.6-03.
 USEPA, 1995. Region IV Supplemental Guidance to RAGS, Bulletin No. 3, November.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE} = \frac{\text{CW} \times \text{IR} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{AT} \times 365 \text{ days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE D-26

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)

ADULT RESIDENT

SITE 17

MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE	CANCER RISK
				FACTOR (mg/kg-day) ⁻¹	INGESTION
No carcinogenic CPCs were selected.					
TOTAL CANCER RISK					0E+00

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE	REFERENCE	HAZARD
			INGESTION (mg/kg-day)	DOSE (mg/kg-day)	QUOTIENT INGESTION
Aluminum	1120	UG/LITER	3.1E-02	1.0E+00	3.1E-02
Iron	1870	UG/LITER	5.1E-02	3.0E-01	1.7E-01
TOTAL HAZARD INDEX					0.2

ND = no data available.

TABLE D-27

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)

CHILD RESIDENT

SITE 17

MILTON, FLORDIA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE	
CONCENTRATION WATER	CW	chemical-specific	ug/liter		
INGESTION RATE	IR		liters/day	USEPA, 1995	CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1
BODY WEIGHT	BW	15	kg	USEPA, 1991	HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)
CONVERSION FACTOR	CF	0.001	mg/ug		
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995	INTAKE = $\frac{CW \times IR \times EF \times ED \times CF}{BW \times AT \times 365}$ days/year
EXPOSURE DURATION	ED	6	years	USEPA, 1995	
AVERAGING TIME					
CANCER	AT	70	years	USEPA, 1991	
NONCANCER	AT	6	years	USEPA, 1991	Note: For noncarcinogenic effects, AT = ED.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance.
 "Standard Default Exposure Factors", OSWER Directive 9285.6-03.
 USEPA, 1995. Region IV Supplemental Guidance to RAGS, Bulletin No. 3, November.

TABLE D-27

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)

CHILD RESIDENT

SITE 17

MILTON, FLORDIA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE	CANCER RISK INGESTION
				FACTOR (mg/kg-day) ⁻¹	
No carcinogenic CPCs were selected.					
TOTAL CANCER RISK				0E+00	

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE	HAZARD QUOTIENT
				(mg/kg-day)	INGESTION
Aluminum	1120	UG/LITER	7.2E-02	1.0E+00	7.2E-02
Iron	1870	UG/LITER	1.2E-01	3.0E-01	4.0E-01
TOTAL HAZARD INDEX				0.5	

TABLE D-28

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)

ADULT RESIDENT

SITE 17

MILTON, FLORIDA

EXPOSURE PARAMETERS

EQUATIONS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm ² -event	USEPA, 1992a
ABSORPTION FRACTION	ABS _d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,000	cm ²	USEPA, 1992a
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1992b
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	7	years	USEPA, 1995
AVERAGING TIME	AT	70	years	USEPA, 1991
CANCER	AT	7	years	USEPA, 1995
NONCANCER	AT			

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992a. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

USEPA, 1992b. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE-INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{\text{DA}_{\text{event}} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

Where:

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS}_d \times \text{CF}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE D-28

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT RESIDENT
SITE 17
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ^[1]	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ^[1]	CANCER RISK DERMAL	TOTAL CANCER RISK	
Arsenic	I	2.8	mg/kg	1.6E-08	1.5E+00	2.5E-08	0.001	3.3E-10	1.5E+00	4.9E-10	2.5E-08	
SUMMARY CANCER RISK						2E-08						
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995). [2] Calculated from oral CSFs.												

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT	
Aluminum	I	17000	mg/kg	1.0E-03	1.0E+00	1.0E-03	0.001	2.0E-05	2.0E-01	1.0E-04	1.1E-03	
Antimony	I	2	mg/kg	1.2E-07	4.0E-04	2.9E-04	0.001	2.3E-09	4.0E-05	5.9E-05	3.5E-04	
Arsenic	I	2.8	mg/kg	1.6E-07	3.0E-04	5.5E-04	0.001	3.3E-09	2.9E-04	1.1E-05	5.6E-04	
Cadmium	I	3.7	mg/kg	2.2E-07	1.0E-03	2.2E-04	0.001	4.3E-09	2.0E-04	2.2E-05	2.4E-04	
Chromium	I	25.5	mg/kg	1.5E-06	5.0E-03	3.0E-04	0.001	3.0E-08	5.5E-04	5.4E-05	3.5E-04	
Iron	I	9510	mg/kg	5.6E-04	3.0E-01	1.9E-03	0.001	1.1E-05	6.0E-03	1.9E-03	3.7E-03	
Vanadium	I	25	mg/kg	1.5E-06	7.0E-03	2.1E-04	0.001	2.9E-08	2.0E-04	1.5E-04	3.6E-04	
Total Petroleum Hydrocarbons	O	19300000	ug/kg	1.1E-03	3.0E-02	3.8E-02	0.01	2.3E-04	2.7E-02	8.4E-03	4.6E-02	
SUMMARY HAZARD INDEX						0.04						
[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995). [2] Calculated from oral RfDs.												

TABLE D-29

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 CHILD RESIDENT
 SITE 17
 MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm ² -event	USEPA, 1992a
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm ²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/ing	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	30	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	2	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	SA _{adj}	766	cm ² -year/kg	USEPA, 1992b
DOSE ABSORBED PER EVENT	DA _{event}	chemical-specific	mg/cm ² -event	USEPA, 1992b
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.

[2] In estimating the dermally absorbed dose for children age 1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook; EPA/600/R-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992a. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_\text{INGESTION} = \frac{\text{CS} \times \text{IR} \times \text{FI} \times \text{CF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT} \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_\text{DERMAL} = (\text{DA}_{\text{event}} \times \text{EF} / \text{AT} \times 365 \text{ days/year}) \times \text{SA}_{\text{adj}}$$

Where:

$$\text{SA}_{\text{adj}} = \text{SUM (SA} \times \text{ED} / \text{BW})$$

$$\text{DA}_{\text{event}} = \text{CS} \times \text{AF} \times \text{ABS} \times \text{CF}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE D-29

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
 CHILD RESIDENT
 SITE 17
 MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day) ¹	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day) ¹	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	2.8	mg/kg	4.4E-08	1.5E+00	6.6E-08	0.001	5.0E-10	1.5E+00	7.6E-10	6.7E-08
SUMMARY CANCER RISK											
7E-08											

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).

[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	17000	mg/kg	9.3E-03	1.0E+00	9.3E-03	0.001	1.1E-04	2.0E-01	5.4E-04	9.9E-03
Antimony	I	2	mg/kg	1.1E-06	4.0E-04	2.7E-03	0.001	1.3E-08	4.0E-05	3.1E-04	3.1E-03
Arsenic	I	2.8	mg/kg	1.5E-06	3.0E-04	5.1E-03	0.001	1.8E-08	2.9E-04	6.1E-05	5.2E-03
Cadmium	I	3.7	mg/kg	2.0E-06	1.0E-03	2.0E-03	0.001	2.3E-08	2.0E-04	1.2E-04	2.1E-03
Chromium	I	25.5	mg/kg	1.4E-05	5.0E-03	2.8E-03	0.001	1.6E-07	5.5E-04	2.9E-04	3.1E-03
Iron	I	9510	mg/kg	5.2E-03	3.0E-01	1.7E-02	0.001	6.0E-05	6.0E-03	1.0E-02	2.7E-02
Vanadium	I	25	mg/kg	1.4E-05	7.0E-03	2.0E-03	0.001	1.6E-07	2.0E-04	7.9E-04	2.7E-03
Total Petroleum Hydrocarbons	O	19300000	ug/kg	1.1E-02	3.0E-02	3.5E-01	0.01	1.2E-03	2.7E-02	4.5E-02	4.0E-01
SUMMARY HAZARD INDEX											
0.4											
0.06											
0.5											

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).

[2] Calculated from oral RfDs.

APPENDIX E

ECOLOGICAL RISK DATA

Table E - 1
Summary of Bioaccumulation Data

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Bioaccumulation Factor [a]					
	Log K _{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]	
VOLATILES [g]						
2-Butanone	0.26	NA	NA	NA	NA	NA
Carbon disulfide	2.2	NA	NA	NA	NA	NA
Ethylbenzene	3.2	NA	NA	NA	NA	NA
Methylene chloride	1.3	NA	NA	NA	NA	NA
Toluene	2.7	NA	NA	NA	NA	NA
Trichloroethylene	2.4	NA	NA	NA	NA	NA
Xylenes (total)	3.2	NA	NA	NA	NA	NA
SEMIVOLATILES						
Butylbenzylphthalate	4.9	5.0E-02	5.7E-02	1.5E-01	NA	
bis(2-Ethylhexyl)phthalate	5.1	5.0E-02	4.4E-02	1.9E-01	NA	
2-Methylnaphthalene	3.9 [h]	5.0E-02	2.2E-01	1.5E-01	NA	
Naphthalene	3.6 [h]	5.0E-02	3.2E-01	1.5E-01	NA	
INORGANICS						
Aluminum	NA	7.5E-02 [i]	8.0E-04 [j]	7.5E-02 [k]	NA	
Antimony	NA	5.0E-02 [i]	4.0E-02 [j]	5.0E-02 [k]	NA	
Cadmium	NA	1.1E+01 [l]	3.3E+01 [m]	2.1E+00 [k]	3.8E-01 [n]	
Chromium	NA	1.8E+00 [i]	6.1E+00 [o]	2.1E+00 [q]	NA	
Copper	NA	1.6E-01 [l]	7.8E-01 [o]	6.0E-01 [m]	NA	
Lead	NA	7.8E-02 [p]	0.0E+00 [m]	1.5E-02 [k]	NA	
Vanadium	NA	1.2E-01 [i]	1.1E-03 [j]	1.2E-01 [k]	NA	
Zinc	NA	1.6E-01 [i]	1.5E-03 [j]	2.8E-01 [k]	NA	
Total Recoverable Petroleum Hydrocarbon						
TRPH	NA	NA	NA	NA	NA	

Table E - 1
Summary of Bioaccumulation Data

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Bioaccumulation Factor [a]				
	Log K _{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

NOTES:

- [a] Units for bioaccumulation factors (BAFs) are mg/kg (wet) tissue weight over mg/kg (dry) soil weight for invertebrates and plants.
The BAF units for small mammals and small birds are mg/kg (wet) tissue weight over mg/kg (wet) food weight.
- [b] Log K_{ow} values are from the Superfund Chemical Data Matrix (USEPA, 1993), unless otherwise noted.
- [c] The value is an average BAF for semivolatiles measured in earthworms (Beyer, 1990) , unless otherwise noted.
Dry weight values were converted to wet weight assuming earthworm are 80% water ($BAF_{wet\ weight} = BAF_{dry\ weight}/ 0.2$).
- [d] Plant BAF were calculated using the following equation presented by Travis and Arms (1988) unless otherwise noted:
 $\log (\text{Plant Bioaccumulation Factor}) = 1.588 - 0.578 (\log K_{ow})$. The calculated plant BAF value was converted from dry weight to wet weight by dividing the BAF by a factor of 0.2 (assuming 80% water content of plants) ($BAF_{wet\ weight} = BAF_{dry\ weight}/ 0.2$).
- [e] Mammalian BAFs were calculated using the following equation from Travis and Arms (1988), unless otherwise noted:
 $\log BTF (\text{biotransfer factor}) = \log K_{ow} - 7.6$.
To convert from BTF to BAF, the calculated log BTF is first transformed to base 10 than multiplied by the average ingestion rates for nonlactating and lactating test animals (12 kg/day). BAFs are converted from dry to wet feed weight by dividing the BAF by a factor of 0.2 ($BAF_{wet\ weight} = BTF * 12\ mg/day/0.2$). There is an uncertainty involved in using this equation for PAHs because the study by Travis and Arms (1988) did not use PAHs in the regression analysis.
For semivolatile analytes with Log K_{ow} less than 5 ($\log K_{ow} < 5$), the BAF was assigned a minimal value of 0.15.
- [f] Bioaccumulation data are generally lacking for birds. Therefore, there is uncertainty associated with estimating body dose for birds without considering what chemicals may have bioaccumulated in prey-item tissue.
- [g] No BAFs were calculated for volatile organic compounds because available evidence suggests that these analytes do not bioaccumulate (Suter, 1993, Maughan, 1993).
- [h] ATSDR (1993) Toxicological Profile for Naphthalene.
- [i] Prey-specific value is not available. The value shown is the small mammal BAF for this chemical.
- [j] Value from Baes et al. (1984) for leafy portions of plants multiplied by 0.2 to represent 80% water composition of plants.
- [k] Value derived from BTFs, presented in Baes et al. (1984) for uptake into cattle. BTF converted to BAF by multiplying by food ingestion rate of 12 kg/day dry weight.
- [l] BAF for earthworms from Diercxens et al. (1985).
- [m] Mammal value for copper and plant value for cadmium are from Levine et al. (1989). Lead does not accumulate in plant tissue; therefore,

Table E - 1
Summary of Bioaccumulation Data

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Bioaccumulation Factor [a]									
	Log K _{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]					
a BAF of zero was assigned.										
[n]	Based on accumulation of cadmium in kidneys of European quail in Pimentel et al. (1984).									
[o]	Median of values reported from Levine et al. (1989).									
[p]	Geometric mean of BAF values (wet weight/dry weights) for worms and woodlice (USEPA, 1985). Wet weight tissue concentrations is calculated assuming 80% body water content.									
[q]	Mean of values for microtus aqrestis and Apodemus sylvaticus in MacFayden (1980).									
<u>Notes:</u>										
Log K _{ow} = Logarithm transformation of the octanol/water partitioning coefficient.										
NA = not available.										
BAF = bioaccumulation factor.										
mg/kg = milligrams per kilogram.										
BTF = biotransfer factor.										
PAH = polynuclear aromatic hydrocarbons.										
> = greater than.										
< = less than.										
% = percent.										

References:

- ATSDR, 1993, "Toxicological Profile for Naphthalene and 2-Methylnaphthalene," Agency for Toxic Substances and Disease Registry, U.S. Public Health Service.
- Baes, C.F. III, R.D. Sharp, A.L. Sjoreen, and R.W. Shor. 1984. "A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture." ORNL-5786. U.S. Department of Energy, Environmental Sciences Division Oak Ridge, Tennessee: Oak Ridge National Laboratory (September).
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Table E - 1
Summary of Bioaccumulation Data

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Bioaccumulation Factor [a]					
	Log K _{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]	
Diercxens, P., D. deWeck, N. Borsinger, B. Rosset, and J. Tarradellas. 1985. "Earthworm Contamination by PCBs and Heavy Metals." Chemosphere 14:511-522.						
Levine, M.B., A.T. Hall, G.W. Barrett, and D.H. Taylor. 1989. "Heavy Metal Concentrations During Ten Years of Sludge Treatment to an Old-Field Community." Journal of Environ. Qual. 18:411-418.						
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Maughan, J.T. 1993. Ecological Assessment of Hazardous Waste Sites. New York: Van Nostrand Reinhold.						
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U.S. Environmental Protection Agency (USEPA). 1985. "Environmental Profiles and Hazard Indices for Constituents of Municipal Sludge: Lead." Office of Water Regulations and Standards. Washington, D.C.						
U.S. Environmental Protection Agency (USEPA). 1993. Superfund Chemical Data Matrix (SCDM). Washington, D.C.						

Table E - 2
Ingestion Toxicity Information for Wildlife

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD ₅₀	LOAEL	RTV ¹	LOAEL	NOAEL	RTV ²	
Volatile Organic Compounds											
2-Butanone	Rat	Oral LD ₅₀	NR	Mortality	2,737	547					RTECS, 1994
	Mouse	Oral LD ₅₀	NR	Mortality	4,050						RTECS, 1994
	Rat	Oral (subchronic)	13 weeks	NOAEL for neurological effects							ATSDR, 1991b
Carbon disulfide	Rabbit	Converted inhalation	34 weeks	NOAEL for Fetotoxicity/ malformations							IRIS, 1993
Ethylbenzene	Rat	Oral (subchronic)	182 days	Liver and kidney toxicity							IRIS, 1993
	Rat	Oral LD ₅₀		Mortality	3,500	700					NIOSH, 1985
Methylene chloride	Rat	Oral LD ₅₀	NR	Mortality	1,600	320					RTECS, 1994
	Dog	Oral LD ₅₀	NR	Mortality	3,000	600					RTECS, 1994
	Rabbit	Oral LD ₅₀	NR	Mortality	1,900						RTECS, 1994
	Rat	Oral (chronic)	2 years	Liver toxicity				52.6	5.9		IRIS, 1993
Toluene	Rat	Oral (subchronic)	3 months	Mortality, blood chemistry, histopathology					12.5		USEPA, 1984a
	Rat	Oral (subchronic)	13 weeks	Increased liver and kidney weight				446			IRIS, 1993
	Rat	Oral LD ₅₀		Mortality	5,000	1,000					NIOSH, 1985
	Mouse	Oral (subchronic)	76 days	Decreased open field activity				76			ATSDR, 1992
Trichloroethylene	Mouse	Single oral dose		Mortality	2,402	480					NIOSH, 1985
	Rat	Single oral dose		Mortality	7,193						NIOSH, 1985
	Mouse	Oral	12 weeks	Decreased dam and fetal weights (Multigenerational)				750		75	ATSDR, 1991b
Xylenes (total)	Rat	Oral LD ₅₀		Mortality	4,300	860					NIOSH, 1985
	Rat	Oral (chronic)	103 weeks	Hyperactivity, decreased BW, mortality				500		50	IRIS, 1993
	Japanese quail	Oral (acute)	5 days	Mortality	20,000	2,014	201.4				Hill, E.F., et al., 1986
Semivolatile Organic Compounds											
Benzo(a)pyrene	Rat	Oral (chronic)	Pregnancy	Sterility in offspring				40			USEPA, 1984b
	Rat	Oral (chronic)	3.5 months	Reproductive				50			USEPA, 1984b
	Mouse	Oral	Multigenerational	Decreased fertility of F1 progeny; decreased F2 litter size.			10			10	MacKenzie, et al. 1981
	Mouse	Oral (subchronic)	6 months	Mortality		120	12				ATSDR, 1993
Butylbenzylphthalate	Rat	Oral LD ₅₀	NR	Mortality	2,330	466					RTECS, 1993
	Rat	Oral	NR	Reproductive effects				21,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				16,400			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				16,400			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				4,900		490	RTECS, 1993
	Mouse	Oral LD ₅₀	NR	Mortality	4,170						RTECS, 1993
bis(2-Ethylhexyl)phthalate	Guinea Pig	Oral LD ₅₀	NR	Mortality	13,750						RTECS, 1993
	Rat	Oral LD ₅₀	NR	Mortality	30,600						RTECS, 1993
	Rat	Oral	NR	Reproductive effects				7,140			RTECS, 1993
	Rat	Oral	NR	Reproductive effects			35			3.5	RTECS, 1993
	Rat	Oral	NR	Reproductive effects				6,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				17,200			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				10,000			RTECS, 1993

Table E - 2
Ingestion Toxicity Information for Wildlife

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD ₅₀	LOAEL	RTV ¹	LOAEL	NOAEL	RTV ²	
2-Methylnaphthalene Naphthalene	Rat	Oral	NR	Reproductive effects				9,766			RTECS, 1993
	Mouse	Oral LD ₅₀	NR	Mortality	30,000						RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				78,880			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				4,200			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				50			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				1,000			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				2,040			RTECS, 1993
	Rabbit	Oral LD ₅₀	NR	Mortality	34,000						RTECS, 1993
	Guinea pig	Oral LD ₅₀	NR	Mortality	26,000						RTECS, 1993
	Guinea pig	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				509,000			RTECS, 1993
	Mouse	Oral LD ₅₀		Mortality	800	160					RTECS, 1993
2-Methylnaphthalene Naphthalene	Mouse	Oral (subchronic)	13 weeks	Renal effects				125			RTECS, 1993
	Rat	Oral LD ₅₀		Mortality	1,630	326					NIOSH, 1985
	Rat	Oral (chronic)	100 weeks	Ocular lesions				41			USEPA, 1990
	Rat	Oral (subchronic)	13 weeks	Decreased body weight gain				35.7			USEPA, 1990
Inorganic Analytes	Mouse	Oral LD ₅₀		Mortality	533	107					ATSDR, 1990a
	Aluminum	Mouse	Oral (chronic)	2-3 generations	Reduced body weight gain of newborns			425		425	NIOSH, 1985
	Rat	Oral (subchronic)	15 days	Reduced growth				100			Bernuzzi, V., et al., 1989
	Rat	Oral LD ₅₀	NR	Mortality	3,700	740					Sax, N.I., 1984
	Rat	Oral	Mortality		16,714	3,343					ATSDR, 1991a
	Rat	Oral (chronic)	NR	Longevity; blood glucose; cholesterol				0.35(water)			IRIS, 1993
	Rat	Oral (subchronic)	24 weeks	Decreased RBC, swelling of hepatic cords				41.8			ATSDR, 1991a
	Cadmium	Rat	Oral	NR	Reproductive effects			155			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				220			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				21.5		2.15	RTECS, 1993
	Rat	Oral	NR	Reproductive effects				23			RTECS, 1993
	Rat	Oral LD ₅₀		Mortality	250						Eisler, R., 1985
	Rat	Oral LD ₅₀	NR	Mortality	225						RTECS, 1993
Chromium	Mouse	Oral LD ₅₀	NR	Mortality	890						RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				448			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				1,700			RTECS, 1993
	Guinea pig	Oral LD ₅₀	NR	Mortality	150	30					Eisler, R., 1985
	Mallard	Oral (subchronic)	90 days	Egg production suppressed		10		1			Eisler, R., 1985
	Japanese Quail	Oral LD ₅₀	5 days	Mortality	126		25.2				Hill & Camardese
	Rat	Oral (subchronic)	90 days	Histopathologic and reproductive effects				1400	0.35		Ivankovic & Preuss
	Mouse	Oral (chronic)	7 weeks	Decreased spermatogenesis		3.5					ATSDR, 1993a
	Black Duck	Oral (subchronic)	5 months	Reproductive effects		200		200	200		Outridge & Scheuan
	Rat	Oral LD ₅₀		Mortality	200	40					ATSDR, 1991c
Copper	Rat	Single oral dose		Reproductive effects				152			RTECS, 1993

Table E - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD ₅₀	LOAEL	RTV ¹	LOAEL	NOAEL	RTV ²	
Lead	Rat	Oral LD ₅₀	NR	Mortality	940		188				Sax, N.I., 1984
	Mouse	Oral (chronic)	30 days	Decreased litter sizes with teratogenic effects				100		10	Lecyk, M., 1980
	Rat	Oral	NR	Reproductive effects				790			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				1,140			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				520			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				1,100			RTECS, 1993
	Calf	Oral LD ₅₀	NR	Mortality		220					Eisler, R., 1988
	Rat	Oral (subchronic)	12-14 days	Decreased fetal body weight				2.5			McClain, R.M., et al., 1972
	Mouse	Oral	NR	Reproductive effects				1,120			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				6,300			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				300		30	RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				4,800			RTECS, 1993
	Domestic animal	Oral	NR	Reproductive effects				662			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				2,118			RTECS, 1993
Vanadium	Kestrel	Diet	NR	Decreased egg laying fertility; decreased egg shell thickness				4.61		4.61	Eisler, R., 1988
	Kestrel nestlings	Oral	10 days	Reduced growth and brain weight; abnormal development				125			Eisler, R., 1988
	Japanese quail	Oral LD ₅₀	5 days	Mortality	24,752						Hill, E.F., et al., 1986
	Rat	Oral (chronic)	2 generations	Developmental effects					7		Kimmel, C.A., et al., 1980
	Guinea pig	Oral LD ₅₀		Mortality	300		60				Sax, N.I., 1984
	Rock dove	Oral (chronic)	NR	Kidney pathology; learning deficiencies	300		60				Allen, J.R., et al., 1979
	Rock dove	Oral LD ₅₀		Mortality	375		75				Kendall, R.J., et al., 1985
	Japanese quail	Oral LD ₅₀	5 days	Mortality	96		19.2				Hill, E.F., et al., 1986
	Mouse	Gavage LD ₅₀	One time	Mortality	31		6.2				ATSDR, 1990b
	Rat	Oral (subchronic)	2 months	Hypertension				15			Susic, D., et al., 1986
Zinc	Rat	Oral (subchronic)	35 days	Development effects				8.4		8.4	Domingo, J.L., et al., 1986
	Chicken	Oral (subchronic)	6 weeks	Decrease in egg laying				11		1.1	Berg, L.R., et al., 1963
	Rat	Oral - LD ₅₀		Mortality	2510			502		200	RTECS, 1993
	Rat	Oral	Gestation	Fetal reseoprints in 4-20% of population				390		20	Schlicker, A.A., et al., 1968
	Ferret	Oral	3-13 days	Mortality & gastrointestinal effects							Strauba, E.F., et al., 1980
	Rat	Oral (subchronic)	NR	Kidney toxicity						160	Llobet, J.M., et al., 1988
Total Recoverable Petroleum Hydrocarbons											
TRPH	NA	NA	NA	NA							

¹ Selected lethal RTVs are boxed. The lethal RTVs correspond to the NOAEL when available. When an NOAEL is not available, then the RTV value is calculated by applying a ten-fold application factor to the LOAEL or a five-fold application factor to the Oral LD₅₀.

² Selected sublethal RTVs are boxed. The sublethal RTV corresponds to the NOAEL when available. When an NOAEL is not available, the sublethal RTV value is calculated by applying a ten-fold application factor to the sublethal LOAEL.

³ Sublethal RTV for benzo (a) pyrene is equal to the LOAEL value because the toxicity test is multi-generational in duration.

Table E - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD ₅₀	LOAEL	RTV ⁴	LOAEL	NOAEL	RTV ²	

⁴ Sublethal RTV for aluminum is equal to the LOAEL value because the toxicity test is multi-generational in duration.

⁵ Converted to dose per kilogram body weight by multiplying the reported value by ingestion rate and dividing by body weight. Body weights for birds was obtained from Dunning, 1984.

Ingestion rates were calculated using the following regression equation (for all birds) from USEPA , 1993): Food Ingestion (kg/day) = 0.00582 * Body Weight^{0.651} (kg).

Ingestion rates for the chicken from NRC, 1984.

⁶ Converted from 30 ppm to 11 mg/kg BW-day using standard default parameters USEPA, 1988.

Notes: mg/kg = milligrams per kilogram.

RTV = reference toxicity value.

BW = Body weight.

LD₅₀ = dose resulting in 50% mortality in test population.

LOAEL = lowest observed adverse effect level.

NOAEL = no observed adverse effect level.

NR = not reported.

PAH = polynuclear aromatic hydrocarbons.

LC_{20,10} = lethal concentration for 20% or 10% of the population.

> = greater than.

RBC = risk-based concentration.

% = percent.

gest = gestation.

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Table E - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD ₅₀	LOAEL	RTV ¹	LOAEL	NOAEL	RTV ²	

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Table E - 3
RTVs Selected for Ecological Risk Assessment [a]
Units (mg/kgBW/day)

Analyte	Remedial Investigation Report Site 17, Crash Crew Training Area Naval Air Station Whiting Field Milton, Florida							
	Small Mammal [b]		Small Bird [c]		Predatory Mammal [d]		Predatory Bird [e]	
	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal
Volatile Organic Compounds								
2-Butanone	547	173	NA	NA	547	173	NA	NA
Carbon disulfide	NA	11	NA	NA	NA	11	NA	NA
Ethylbenzene	700	29.1	NA	NA	700	29.1	NA	NA
Methylene chloride	320	NA	NA	NA	600	NA	NA	NA
Toluene	1000	NA	NA	NA	1000	NA	NA	NA
Trichloroethylene	480	75	NA	NA	480	75	NA	NA
Xylenes (total)	860	50	201.4	NA	860	50	201.4	NA
Semivolatile Organic Compounds								
Butylbenzylphthalate	466	490	NA	NA	466	490	NA	NA
bis(2-Ethylhexyl)phthalate	160	3.5	NA	NA	160	3.5	NA	NA
2-Methylnaphthalene	326	10 [f]	NA	NA	326	10 [f]	NA	NA
Naphthalene	107	10 [f]	NA	NA	107	10 [f]	NA	NA
Inorganic Compounds								
Aluminum	740	425	NA	NA	740	425	NA	NA
Antimony	3,343	NA	NA	NA	3,343	NA	NA	NA
Cadmium	30	2.15	NA	1	30	2.15	NA	1
Chromium	502	20	NA	NA	502	20	NA	NA
Copper	188	10	NA	NA	188	10	NA	NA
Lead	60	30	75	4.61	60	30	75	4.61
Vanadium	6.2	8.4	19.2	1.1	6.2	8.4	19.2	1.1
Zinc	40	0.35	25.2	200	40	0.35	25.2	200
Total Recoverable Petroleum Hydrocarbons								
TRPH	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

[a] Lethal and sublethal RTVs correspond to the boxed lethal RTVs presented in Table E-2. Lethal RTVs correspond to the highest NOAEL.

When an NOAEL value is not available then one-tenth of the lowest LOAEL, or one-fifth of the lowest LD₅₀ is used as a surrogate value.

Sublethal RTVs correspond to the highest NOAEL. When an NOAEL value is not available, then one-tenth of the sublethal LOAEL is used as a surrogate.

Table E - 3
RTVs Selected for Ecological Risk Assessment [a]
Units (mg/kgBW/day)

Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Small Mammal [b]		Small Bird [c]		Predatory Mammal [d]		Predatory Bird [e]	
	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal

[b] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the cotton mouse and short-tailed shrew.

[c] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the mourning dove and eastern meadowlark.

[d] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the red fox.

When no data are available for the red fox, the small mammal value is used as a surrogate.

[e] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the red-tailed hawk. When no data are available, the small bird value is used as a surrogate.

[f] The value for benzo(a)pyrene is used as a surrogate.

Notes:

NA = not available.

RTV = reference toxicity value.

mg/kg = milligrams per kilogram.

LD₅₀ = dose resulting in 50% mortality in test population.

LOAEL = lowest observed adverse effect level.

NOAEL = no observed adverse effect level.

Table E - 4
Summary of Toxicity Data for Plant Receptors

Remedial Investigation Report Site 17, Crash Crew Training Area Naval Air Station Whiting Field Milton, Florida		
Analyte	Reference	RTV in soil [a] (mg/kg)
VOLATILE ORGANICS		
2-Butanone		NA
Carbon disulfide		NA
Ethylbenzene		200 [b]
Methylene chloride		>1,000 [c]
Toluene	Will and Suter, 1995	200
Trichloroethylene		>1,000 [c]
Xylene (total)	Hulzebos <i>et al.</i> , 1993 [d]	>1,000
SEMI-VOLATILE ORGANICS		
Butylbenzylphthalate		200 [e]
bis(2-Ethylhexyl)phthalate	Hulzebos <i>et al.</i> , 1993 [d]	>1,000
2-Methylnaphthalene		100 [f]
Naphthalene	Hulzebos <i>et al.</i> , 1993 [d]	100
INORGANICS		
Aluminum	Will and Suter, 1995	50
Antimony	Will and Suter, 1995	5
Cadmium	Will and Suter, 1995	3
Chromium	Will and Suter, 1995	50
Copper	Will and Suter, 1995	100
Lead	Will and Suter, 1995	50
Vanadium	Will and Suter, 1995	2
Zinc	Will and Suter, 1995	1
Total Recoverable Petroleum Hydrocarbons		
TRPH		NA
[a] RTVs are equal to chemical concentrations in soil that are not expected to result in adverse effects to plants. [b] Value for toluene used as a surrogate (Will and Suter, 1995). [c] Value for tetrachloroethylene used as a surrogate. [d] Value represents 14-day growth EC ₅₀ for <i>Lactuca sativa</i> in soil. [e] Value for di-n-butylphthalate used as a surrogate (Will and Suter, 1995). [f] Value for naphthalene used as a surrogate (Hulzebos <i>et al.</i> , 1993).		
Notes: NA = Not Available. RTV = reference toxicity value. mg/kg = milligrams per kilogram. EC ₅₀ = media concentration resulting in 50% mortality in test population. > = greater than.		
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Table E -5
Summary of Toxicity Data for Terrestrial Invertebrates

Remedial Investigation Report
 Site 17, Crash Crew Training Area
 Naval Air Station Whiting Field
 Milton, Florida

Analyte	Test Type	Test Duration	Test Species	Chemical Concentration (mg/kg)	Effect	RTV (mg/kg)	Reference
VOLATILE ORGANIC COMPOUNDS							
2-Butanone	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	Soil Test	14-day	<i>E. foetida</i>	106	LC ₅₀	21	[a] Neuhauser et al., 1985.
Methylene chloride	Soil Test	14-day	<i>E. foetida</i>	740	LC ₅₀	150	[a] Neuhauser et al., 1985.
Toluene	NA	NA	NA	NA	NA	NA	NA
Trichloroethylene	Soil Test	14-day	<i>E. foetida</i>	740	LC ₅₀	150	[a] Neuhauser et al., 1985.
Xylene (total)	Soil Test	14-day	<i>E. foetida</i>	106	LC ₅₀	21	[a] Neuhauser et al., 1985.
SEMOVOLATILE ORGANIC COMPOUNDS							
Butylbenzylphthalate	Soil Test	14-day	4 test species	2,390	LC ₅₀	478	[b] Neuhauser et al., 1985.
bis(2-Ethylhexyl)phthalate	Soil Test	14-day	4 test species	2,390	LC ₅₀	478	[b] Neuhauser et al., 1985.
2-Methylnaphthalene	Soil Test	14-day	<i>E. foetida</i>	173	LC ₅₀	34	[a] Neuhauser et al., 1985.
Naphthalene	Soil Test	14-day	<i>E. foetida</i>	173	LC ₅₀	34	[a] Neuhauser et al., 1985.
INORGANIC ANALYTES							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Cadmium	Soil Test	14-day	<i>E. foetida</i>	900	0 % mortality		Bouche et al., 1987
Cadmium	Soil Test	14-day	<i>E. foetida</i>	2,700	100 % mortality		Bouche et al., 1987
Cadmium	Soil Test	14-day	<i>E. foetida</i>	1,000 [c]	LC ₅₀		van Gestel and van Dis, 1988
Cadmium	Soil Test	20-week	<i>E. foetida</i>	50 [d]	Decrease in cocoon production	50	[e] Malecki et al., 1982
Cadmium	Soil Test	2-week	<i>E. foetida</i>	1,843	LC ₅₀		Neuhauser et al., 1985
Chromium	Soil Test	8 weeks	<i>E. foetida</i>	250 [d]	Reproduction 50% inhibited	50	Molnar et al, 1989
Copper	Soil Test	14-day	<i>E. foetida</i>	10	0 % mortality		Bouche et al., 1987
Copper	Soil Test	14-day	<i>E. foetida</i>	30	20 % mortality	30	Bouche et al., 1987
Copper	Soil Test	20-week	<i>E. foetida</i>	2,000 [d]	Decrease in cocoon production		Malecki et al., 1982
Copper	Soil Test	2-week	<i>E. foetida</i>	643	LC ₅₀		Neuhauser et al., 1985
Lead	Soil Test	20-week	<i>E. foetida</i>	5,000 [d]	Decrease in cocoon production		Malecki et al., 1982
Lead	Soil Test	2-week	<i>E. foetida</i>	5,941	LC ₅₀	1,190	[e] Neuhauser et al., 1985
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	Soil Test	2 weeks	<i>E. foetida</i>	662	LC ₅₀	130	[e] Neuhauser et al., 1985
Zinc	Soil Test	20 weeks	<i>E. foetida</i>	5,000 [d]	Decrease in cocoon production		Malecki et al., 1982

Table E -5
Summary of Toxicity Data for Terrestrial Invertebrates

**Remedial Investigation Report
Site 17, Crash Crew Training Area
Naval Air Station Whiting Field
Milton, Florida**

TABLE E-6

ESTIMATION OF CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO RME CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
 NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

EXPOSURE PARAMETERS [c]

Indicator Species		Percent Prey in Diet					Home Range (acres)	Site Foraging Frequency [d]	Dietary Ingestion Rate	Water Ingestion Rate	Body Weight (kg)	Exposure Duration
		Inverts	Plants	Small Mammals	Amphibians	Birds			(kg/day)	(l/day)		
<i>Cotton mouse</i>	Small herb. mammal	10%	88%	0%	0%	0%	2%	0.147	1.0E+00	0.0029	NA	0.021
<i>Mourning dove</i>	Small omn. bird	1%	94%	0%	0%	0%	5%	5	8.0E-01	0.015	NA	0.13
<i>Short-tailed shrew</i>	Small omn. mammal	78%	12%	0%	0%	0%	10%	0.96	1.0E+00	0.002	NA	0.017
<i>Eastern meadowlark</i>	Small omn. bird	75%	20%	0%	0%	0%	5%	5	8.0E-01	0.012	NA	0.087
<i>Red fox</i>	Predatory mammal	20%	10%	57%	0%	10%	3%	250	1.6E-02	0.240	NA	4.69
<i>Red-tailed hawk</i>	Predatory bird	0%	0%	70%	0%	27%	3%	800	5.0E-03	0.059	NA	1.02

SITE AREA: 4 acres

NOTES:

[c] Documentation of exposure parameters presented in Table 7-5.

[d] Site Foraging Frequency (SFF). Calculated by dividing site area by receptor home range (cannot exceed 1.0)

NA = Not applicable

TABLE E-7

ESTIMATION OF CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO RME CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

EXPOSURE CONCENTRATION DATA

CHEMICAL	REASONABLE MAXIMUM SOIL CONCENTRATION (mg/kg)
2-Butanone	8.0E-02
Carbon disulfide	2.6E-02
Ethylbenzene	7.7E-01
Methylene chloride	1.3E-01
Toluene	5.7E-01
Trichloroethylene	1.6E-01
Xylene (total)	1.4E+01
Butylbenzylphthalate	4.9E-01
bis(2-ethylhexyl)phthalate	7.7E-01
2-Methylnaphthalene	1.3E+00
Naphthalene	9.6E-01
Aluminum	1.7E+04
Antimony	2.0E+00
Cadmium	3.7E+00
Chromium	4.9E+01
Copper	5.0E+01
Lead	8.6E+01
Vanadium	2.5E+01
Zinc	1.0E+02

TISSUE LEVELS IN PRIMARY PREY ITEMS (Site Specific)							
Invertebrate BAF [a]	Invertebrate Tissue Level (mg/kg) [b]	Plant BAF [a]	Plant Tissue Level (mg/kg) [b]	Mammal SAF [a]	Mammal Tissue Level (mg/kg) [c]	Bird BAF [a]	Small Bird Tissue Level (mg/kg) [c]
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00
5.0E-02	2.5E-02	5.7E-02	2.8E-02	1.5E-01	8.1E-03	NA	0.0E+00
5.0E-02	3.9E-02	4.4E-02	3.4E-02	1.9E-01	1.5E-02	NA	0.0E+00
5.0E-02	6.4E-02	2.2E-01	2.8E-01	1.5E-01	3.7E-02	NA	0.0E+00
5.0E-02	4.8E-02	3.2E-01	3.1E-01	1.5E-01	3.5E-02	NA	0.0E+00
7.5E-02	1.3E+03	8.0E-04	1.4E+01	7.5E-02	1.2E+02	NA	0.0E+00
5.0E-02	1.0E-01	4.0E-02	8.0E-02	5.0E-02	1.0E-02	NA	0.0E+00
1.1E+01	4.1E+01	3.3E+01	1.2E+02	2.1E+00	1.7E+02	3.8E-01	2.6E+01
1.6E-01	7.8E+00	1.5E-03	7.3E-02	2.8E-01	1.8E+00	NA	0.0E+00
1.6E-01	8.1E+00	7.8E-01	3.9E+01	6.0E-01	1.6E+01	NA	0.0E+00
7.8E-02	6.7E+00	0.0E+00	0.0E+00	1.5E-02	1.2E-01	NA	0.0E+00
1.2E-01	3.0E+00	1.1E-03	2.8E-02	1.2E-01	3.4E-01	NA	0.0E+00
1.8E+00	1.8E+02	6.1E-01	6.1E+01	2.1E+00	2.4E+02	NA	0.0E+00

[a] Bioaccumulation factors are presented in Appendix E, Table E-1

[b] Plant and invertebrate tissue concentrations are calculated by multiplying the soil concentration by the plant or invertebrate BAF.

[c] Mammal and bird tissue concentrations are calculated by multiplying the small mammal or bird body weight- and ingestion rate-normalized TBD by the mammal or bird BAF.

NA = Not analyzed

ND = Not detected

TBD = Total body dose

TABLE E-7

ESTIMATION OF CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO RME CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17

NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

TOTAL BODY DOSE (mg/kgBW-day) [a]

Chemical	Cotton mouse	Mourning dove	Short-tailed shrew	Eastern meadowlark	Red fox	Red-tailed hawk
2-Butanone	2.2E-04	3.8E-04	1.1E-03	4.4E-04	2.0E-06	6.9E-07
Carbon disulfide	7.2E-05	1.2E-04	3.7E-04	1.4E-04	6.4E-07	2.3E-07
Ethylbenzene	2.1E-03	3.6E-03	1.1E-02	4.2E-03	1.9E-05	6.6E-06
Methylene chloride	3.6E-04	6.2E-04	1.8E-03	7.1E-04	3.2E-06	1.1E-06
Toluene	1.6E-03	2.7E-03	8.0E-03	3.1E-03	1.4E-05	4.9E-06
Trichloroethylene	4.4E-04	7.6E-04	2.3E-03	8.8E-04	3.9E-06	1.4E-06
Xylene (total)	4.0E-02	6.9E-02	2.0E-01	7.9E-02	3.6E-04	1.3E-04
Butylbenzylphthalate	5.1E-03	4.8E-03	1.0E-02	5.3E-03	2.2E-05	5.9E-06
bis(2-ethylhexyl)phthalate	6.8E-03	6.7E-03	1.6E-02	8.1E-03	3.5E-05	9.8E-06
2-Methylnaphthalene	3.8E-02	3.1E-02	3.0E-02	1.8E-02	8.2E-05	1.8E-05
Naphthalene	4.1E-02	3.2E-02	2.4E-02	1.6E-02	7.3E-05	1.5E-05
Aluminum	6.6E+01	8.3E+01	3.8E+02	2.0E+02	6.8E-01	1.7E-01
Antimony	1.7E-02	1.7E-02	4.1E-02	2.1E-02	7.7E-05	1.9E-05
Cadmium	1.5E+01	1.1E+01	6.6E+00	6.0E+00	9.6E-02	3.6E-02
Chromium	2.5E-01	2.4E-01	1.5E+00	9.1E-01	3.3E-03	7.8E-04
Copper	5.0E+00	3.7E+00	2.3E+00	1.8E+00	1.3E-02	3.6E-03
Lead	3.3E-01	4.1E-01	1.9E+00	1.0E+00	3.3E-03	7.7E-04
Vanadium	1.1E-01	1.2E-01	6.8E-01	3.8E-01	1.3E-03	2.9E-04
Zinc	1.0E+01	6.1E+00	2.2E+01	1.7E+01	1.5E-01	5.0E-02

[a] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the SFF, exposure duration, and ingestion rate, and then dividing by body weight.

TABLE E-8

RISK FROM POTENTIAL LETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME CONCENTRATIONS
OF CPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17

NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

CHEMICAL	Cotton mouse			Mourning dove			Short-tailed shrew		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
2-Butanone	2.2E-04	5.5E+02	4.0E-07	3.8E-04			1.1E-03	5.5E+02	2.1E-06
Carbon disulfide	7.2E-05			1.2E-04			3.7E-04		
Ethylbenzene	2.1E-03	7.0E+02	3.0E-06	3.6E-03			1.1E-02	7.0E+02	1.5E-05
Methylene chloride	3.6E-04	3.2E+02	1.1E-06	6.2E-04			1.8E-03	3.2E+02	5.7E-06
Toluene	1.6E-03	1.0E+03	1.6E-06	2.7E-03			8.0E-03	1.0E+03	8.0E-06
Trichloroethylene	4.4E-04	4.8E+02	9.2E-07	7.6E-04			2.3E-03	4.8E+02	4.7E-06
Xylene (total)	4.0E-02	8.6E+02	4.6E-05	6.9E-02	2.0E+02	3.4E-04	2.0E-01	8.6E+02	2.4E-04
Butylbenzylphthalate	5.1E-03	4.7E+02	1.1E-05	4.8E-03			1.0E-02	4.7E+02	2.2E-05
bis(2-ethylhexyl)phthalate	6.8E-03	1.6E+02	4.3E-05	6.7E-03			1.6E-02	1.6E+02	9.8E-05
2-Methylnaphthalene	3.8E-02	3.3E+02	1.2E-04	3.1E-02			3.0E-02	3.3E+02	9.1E-05
Naphthalene	4.1E-02	1.1E+02	3.8E-04	3.2E-02			2.4E-02	1.1E+02	2.3E-04
Aluminum	6.6E+01	7.4E+02	8.9E-02	8.3E+01			3.8E+02	7.4E+02	5.1E-01
Antimony	1.7E-02	3.3E+03	5.0E-06	1.7E-02			4.1E-02	3.3E+03	1.2E-05
Cadmium	1.5E+01	3.0E+01	5.1E-01	1.1E+01			6.6E+00	3.0E+01	2.2E-01
Chromium	2.5E-01	4.0E+01	6.3E-03	2.4E-01	2.5E+01	9.7E-03	1.5E+00	4.0E+01	3.9E-02
Copper	5.0E+00	1.9E+02	2.7E-02	3.7E+00			2.3E+00	1.9E+02	1.2E-02
Lead	3.3E-01	6.0E+01	5.5E-03	4.1E-01	7.5E+01	5.5E-03	1.9E+00	6.0E+01	3.2E-02
Vanadium	1.1E-01	6.2E+00	1.8E-02	1.2E-01	1.9E+01	6.4E-03	6.8E-01	6.2E+00	1.1E-01
Zinc	1.0E+01	5.0E+02	2.0E-02	6.1E+00			2.2E+01	5.0E+02	4.4E-02
SUMMARY HAZARD INDEX		6.8E-01			2.2E-02			9.7E-01	

TBD = Total Body Dose (mg/kgBW-day).

RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix E, Table E-3.

HQ = Hazard Quotient (calculated by dividing TBD by RTV)

NA = Not Available

TABLE E-8

RISK FROM POTENTIAL LETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME CONCENTRATIONS
OF CPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

CHEMICAL	Eastern meadowlark			Red fox			Red-tailed hawk		
	TBD	Lethal RTV	HQ	TBD	Lethal RTV	HQ	TBD	Lethal RTV	HQ
2-Butanone	4.4E-04			2.0E-06	5.5E+02	3.6E-09	6.9E-07		
Carbon disulfide	1.4E-04			6.4E-07			2.3E-07		
Ethylbenzene	4.2E-03			1.9E-05	7.0E+02	2.7E-08	6.6E-06		
Methylene chloride	7.1E-04			3.2E-06	6.0E+02	5.3E-09	1.1E-06		
Toluene	3.1E-03			1.4E-05	1.0E+03	1.4E-08	4.9E-06		
Trichloroethylene	8.8E-04			3.9E-06	4.8E+02	8.2E-09	1.4E-06		
Xylene (total)	7.9E-02	2.0E+02	1.4E-02	3.6E-04	8.6E+02	4.1E-07	1.3E-04	2.0E+02	6.2E-07
Butylbenzylphthalate	5.3E-03			2.2E-05	4.7E+02	4.7E-08	5.9E-06		
bis(2-ethylhexyl)phthalate	8.1E-03			3.5E-05	1.6E+02	2.2E-07	9.8E-06		
2-Methylnaphthalene	1.8E-02			8.2E-05	3.3E+02	2.5E-07	1.8E-05		
Naphthalene	1.6E-02			7.3E-05	1.1E+02	6.8E-07	1.5E-05		
Aluminum	2.0E+02			6.8E-01	7.4E+02	9.2E-04	1.7E-01		
Antimony	2.1E-02			7.7E-05	3.3E+03	2.3E-08	1.9E-05		
Cadmium	6.0E+00			9.6E-02	3.0E+01	3.2E-03	3.6E-02		
Chromium	9.1E-01	2.5E+01	3.6E-02	3.3E-03	4.0E+01	8.3E-05	7.8E-04		
Copper	1.8E+00			1.3E-02	1.9E+02	7.0E-05	3.6E-03		
Lead	1.0E+00	7.5E+01	1.4E-02	3.3E-03	6.0E+01	5.4E-05	7.7E-04	7.5E+01	1.0E-05
Vanadium	3.8E-01	1.9E+01	2.0E-02	1.3E-03	6.2E+00	2.0E-04	2.9E-04	1.9E+01	1.5E-05
Zinc	1.7E+01			1.5E-01	5.0E+02	3.0E-04	5.0E-02		
SUMMARY HAZARD INDEX		8.3E-02			4.8E-03		2.6E-05		

TBD = Total Body Dose (mg/kgBW-day).

RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix E, Table E-3.

HQ = Hazard Quotient (calculated by dividing TBD by RTV)

NA = Not Available

TABLE E-9
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME CONCENTRATIONS
OF CPC'S IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

CHEMICAL	Cotton mouse			Mourning dove			Short-tailed shrew		
	Sublethal			Sublethal			Sublethal		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
2-Butanone	2.2E-04	1.7E+02	1.3E-06	3.8E-04			1.1E-03	1.7E+02	6.5E-06
Carbon disulfide	7.2E-05	1.1E+01	6.5E-06	1.2E-04			3.7E-04	1.1E+01	3.3E-05
Ethylbenzene	2.1E-03	2.9E+01	7.3E-05	3.6E-03			1.1E-02	2.9E+01	3.7E-04
Methylene chloride	3.6E-04			6.2E-04			1.8E-03		
Toluene	1.6E-03			2.7E-03			8.0E-03		
Trichloroethylene	4.4E-04	7.5E+01	5.9E-06	7.6E-04			2.3E-03	7.5E+01	3.0E-05
Xylene (total)	4.0E-02	5.0E+01	8.0E-04	6.9E-02			2.0E-01	5.0E+01	4.1E-03
Butylbenzylphthalate	5.1E-03	4.9E+02	1.0E-05	4.8E-03			1.0E-02	4.9E+02	2.1E-05
bis(2-ethylhexyl)phthalate	6.8E-03	3.5E+00	1.9E-03	6.7E-03			1.6E-02	3.5E+00	4.5E-03
2-Methylnaphthalene	3.8E-02	1.0E+01	3.8E-03	3.1E-02			3.0E-02	1.0E+01	3.0E-03
Naphthalene	4.1E-02	1.0E+01	4.1E-03	3.2E-02			2.4E-02	1.0E+01	2.4E-03
Aluminum	6.6E+01	4.3E+02	1.6E-01	8.3E+01			3.8E+02	4.3E+02	8.9E-01
Antimony	1.7E-02			1.7E-02			4.1E-02		
Cadmium	1.5E+01	2.2E+00	7.2E+00	1.1E+01	1.0E+00	1.1E+01	6.6E+00	2.2E+00	3.1E+00
Chromium	2.5E-01	3.5E-01	7.2E-01	2.4E-01	2.0E+02	1.2E-03	1.5E+00	3.5E-01	4.4E+00
Copper	5.0E+00	1.0E+01	5.0E-01	3.7E+00			2.3E+00	1.0E+01	2.3E-01
Lead	3.3E-01	3.0E+01	1.1E-02	4.1E-01	4.6E+00	8.9E-02	1.9E+00	3.0E+01	6.5E-02
Vanadium	1.1E-01	8.4E+00	1.4E-02	1.2E-01	1.1E+00	1.1E-01	6.8E-01	8.4E+00	8.1E-02
Zinc	1.0E+01	2.0E+01	5.1E-01	6.1E+00			2.2E+01	2.0E+01	1.1E+00
SUMMARY HAZARD INDEX		9.1E+00			1.1E+01				9.9E+00

TBD = Total Body Dose (mg/kgBW-day).

RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix E, Table E-3.

HQ = Hazard Quotient (calculated by dividing TBD by RTV)

NA = Not Available

TABLE E-9
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME EXPOSURE CONCENTRATIONS OF CPC'S
IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

CHEMICAL	Eastern meadowlark			Red fox			Red-tailed hawk		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
2-Butanone	4.4E-04			2.0E-06	1.7E+02	1.1E-08	6.9E-07		
Carbon disulfide	1.4E-04			6.4E-07	1.1E+01	5.8E-08	2.3E-07		
Ethylbenzene	4.2E-03			1.9E-05	2.9E+01	6.5E-07	6.6E-06		
Methylene chloride	7.1E-04			3.2E-06			1.1E-06		
Toluene	3.1E-03			1.4E-05			4.9E-06		
Trichloroethylene	8.8E-04			3.9E-06	7.5E+01	5.2E-08	1.4E-06		
Xylene (total)	7.9E-02			3.6E-04	5.0E+01	7.1E-06	1.3E-04		
Butylbenzylphthalate	5.3E-03			2.2E-05	4.9E+02	4.5E-08	5.9E-06		
bis(2-ethylhexyl)phthalate	8.1E-03			3.5E-05	3.5E+00	1.0E-05	9.8E-06		
2-Methylnaphthalene	1.8E-02			8.2E-05	1.0E+01	8.2E-06	1.8E-05		
Naphthalene	1.6E-02			7.3E-05	1.0E+01	7.3E-06	1.5E-05		
Aluminum	2.0E+02			6.8E-01	4.3E+02	1.6E-03	1.7E-01		
Antimony	2.1E-02			7.7E-05			1.9E-05		
Cadmium	6.0E+00	1.0E+00	6.0E+00	9.6E-02	2.2E+00	4.5E-02	3.6E-02	1.0E+00	3.6E-02
Chromium	9.1E-01	2.0E+02	4.5E-03	3.3E-03	3.5E-01	9.5E-03	7.8E-04	2.0E+02	3.9E-06
Copper	1.8E+00			1.3E-02	1.0E+01	1.3E-03	3.6E-03		
Lead	1.0E+00	4.6E+00	2.2E-01	3.3E-03	3.0E+01	1.1E-04	7.7E-04	4.6E+00	1.7E-04
Vanadium	3.8E-01	1.1E+00	3.5E-01	1.3E-03	8.4E+00	1.5E-04	2.9E-04	1.1E+00	2.6E-04
Zinc	1.7E+01			1.5E-01	2.0E+01	7.5E-03	5.0E-02		
SUMMARY HAZARD INDEX			6.6E+00			6.5E-02			3.6E-02

TBD = Total Body Dose (mg/kgBW-day).

RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix E, Table E-3.

HQ = Hazard Quotient (calculated by dividing TBD by RTV)

NA = Not Available

TABLE E-10
ESTIMATION OF CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO CT CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

EXPOSURE CONCENTRATION DATA

CHEMICAL	CENTRAL TENDENCY SOIL CONCENTRATION (mg/kg)
2-Butanone	8.0E-02
Carbon disulfide	2.6E-02
Ethylbenzene	7.1E-01
Methylene chloride	1.3E-01
Toluene	5.7E-01
Trichloroethylene	1.3E-01
Xylene (total)	5.7E+00
Butylbenzylphthalate	4.9E-01
bis(2-ethylhexyl)phthalate	6.0E-01
2-Methylnaphthalene	8.9E-01
Naphthalene	7.7E-01
Aluminum	1.4E+04
Antimony	1.9E+00
Cadmium	2.5E+00
Chromium	2.0E+01
Copper	3.5E+01
Lead	4.6E+01
Vanadium	2.0E+01
Zinc	3.7E+01

TISSUE LEVELS IN PRIMARY PREY ITEMS (Site Specific)								
INVERTEBRATE BAF [a]	INVERTEBRATE Tissue Level (mg/kg) [b]	PLANT BAF [a]	PLANT Tissue Level (mg/kg) [b]	MAMMAL BAF [a]	MAMMAL Tissue Level (mg/kg) [c]	BIRD BAF [a]	BIRD Tissue Level (mg/kg) [c]	
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	
NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	NA	0.0E+00	
5.0E-02	2.5E-02	5.7E-02	2.8E-02	1.5E-01	8.1E-03	NA	0.0E+00	
5.0E-02	3.0E-02	4.4E-02	2.6E-02	1.9E-01	1.2E-02	NA	0.0E+00	
5.0E-02	4.5E-02	2.2E-01	2.0E-01	1.5E-01	2.6E-02	NA	0.0E+00	
5.0E-02	3.9E-02	3.2E-01	2.5E-01	1.5E-01	2.8E-02	NA	0.0E+00	
7.5E-02	1.0E+03	8.0E-04	1.1E+01	7.5E-02	9.6E+01	NA	0.0E+00	
5.0E-02	9.5E-02	4.0E-02	7.6E-02	5.0E-02	9.7E-03	NA	0.0E+00	
1.1E+01	2.8E+01	3.3E+01	8.3E+01	2.1E+00	1.1E+02	3.8E-01	1.8E+01	
1.6E-01	3.2E+00	1.5E-03	3.0E-02	2.8E-01	7.3E-01	NA	0.0E+00	
1.6E-01	5.5E+00	7.8E-01	2.7E+01	6.0E-01	1.1E+01	NA	0.0E+00	
7.8E-02	3.6E+00	0.0E+00	0.0E+00	1.5E-02	6.5E-02	NA	0.0E+00	
1.2E-01	2.4E+00	1.1E-03	2.2E-02	1.2E-01	2.8E-01	NA	0.0E+00	
1.8E+00	6.7E+01	6.1E-01	2.3E+01	2.1E+00	9.0E+01	NA	0.0E+00	

[a] Bioaccumulation factors are presented in Appendix E, Table E-1

[b] Plant and invertebrate tissue concentrations are calculated by multiplying the soil concentration by the plant or invertebrate BAF.

[c] Mammal and bird tissue concentrations are calculated by multiplying the small mammal or bird body weight- and ingestion rate-normalized TBD by the mammal or bird BAF.

NA = Not analyzed

ND = Not detected

TBD = Total body dose

TABLE E-10

ESTIMATED CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM INGESTION OF MAXIMUM EXPOSURE CONCENTRATIONS OF CPC'S
IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

TOTAL BODY DOSE (mg/kgBW-day) [a]

Chemical	Cotton mouse	Mourning dove	Short-tailed shrew	Eastern meadowlark	Red fox	Red-tailed hawk
2-Butanone	2.2E-04	3.8E-04	1.1E-03	4.4E-04	2.0E-06	6.9E-07
Carbon disulfide	7.2E-05	1.2E-04	3.7E-04	1.4E-04	6.4E-07	2.3E-07
Ethylbenzene	2.0E-03	3.4E-03	1.0E-02	3.9E-03	1.7E-05	6.2E-06
Methylene chloride	3.6E-04	6.2E-04	1.8E-03	7.1E-04	3.2E-06	1.1E-06
Toluene	1.6E-03	2.7E-03	8.0E-03	3.1E-03	1.4E-05	4.9E-06
Trichloroethylene	3.7E-04	6.3E-04	1.9E-03	7.3E-04	3.3E-06	1.2E-06
Xylene (total)	1.6E-02	2.7E-02	8.1E-02	3.1E-02	1.4E-04	5.0E-05
Butylbenzylphthalate	5.1E-03	4.8E-03	1.0E-02	5.3E-03	2.2E-05	5.9E-06
bis(2-ethylhexyl)phthalate	5.2E-03	5.2E-03	1.2E-02	6.3E-03	2.7E-05	7.5E-06
2-Methylnaphthalene	2.7E-02	2.2E-02	2.1E-02	1.3E-02	5.7E-05	1.3E-05
Naphthalene	3.3E-02	2.6E-02	1.9E-02	1.3E-02	5.9E-05	1.2E-05
Aluminum	5.3E+01	6.7E+01	3.1E+02	1.6E+02	5.5E-01	1.4E-01
Antimony	1.6E-02	1.6E-02	3.9E-02	2.0E-02	7.3E-05	1.8E-05
Cadmium	1.0E+01	7.4E+00	4.5E+00	4.1E+00	6.5E-02	2.4E-02
Chromium	1.0E-01	1.0E-01	6.4E-01	3.7E-01	1.4E-03	3.2E-04
Copper	3.5E+00	2.6E+00	1.6E+00	1.2E+00	9.0E-03	2.5E-03
Lead	1.8E-01	2.2E-01	1.0E+00	5.5E-01	1.8E-03	4.1E-04
Vanadium	9.2E-02	1.0E-01	5.6E-01	3.1E-01	1.0E-03	2.3E-04
Zinc	3.8E+00	2.2E+00	8.2E+00	6.2E+00	5.6E-02	1.9E-02

[a] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the SFF, exposure duration, and ingestion rate, and then dividing by body weight.

TABLE E-11
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM CT CONCENTRATIONS
OF CPC'S IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

CHEMICAL	Cotton mouse Sublethal			Mourning dove Sublethal			Short-tailed shrew Sublethal		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
2-Butanone	2.2E-04	1.7E+02	1.3E-06	3.8E-04			1.1E-03	1.7E+02	6.5E-06
Carbon disulfide	7.2E-05	1.1E+01	6.5E-06	1.2E-04			3.7E-04	1.1E+01	3.3E-05
Ethylbenzene	2.0E-03	2.9E+01	6.7E-05	3.4E-03			1.0E-02	2.9E+01	3.4E-04
Methylene chloride	3.6E-04			6.2E-04			1.8E-03		
Toluene	1.6E-03			2.7E-03			8.0E-03		
Trichloroethylene	3.7E-04	7.5E+01	4.9E-06	6.3E-04			1.9E-03	7.5E+01	2.5E-05
Xylene (total)	1.6E-02	5.0E+01	3.2E-04	2.7E-02			8.1E-02	5.0E+01	1.6E-03
Butylbenzylphthalate	5.1E-03	4.9E+02	1.0E-05	4.8E-03			1.0E-02	4.9E+02	2.1E-05
bis(2-ethylhexyl)phthalate	5.2E-03	3.5E+00	1.5E-03	5.2E-03			1.2E-02	3.5E+00	3.5E-03
2-Methylnaphthalene	2.7E-02	1.0E+01	2.7E-03	2.2E-02			2.1E-02	1.0E+01	2.1E-03
Naphthalene	3.3E-02	1.0E+01	3.3E-03	2.6E-02			1.9E-02	1.0E+01	1.9E-03
Aluminum	5.3E+01	4.3E+02	1.3E-01	6.7E+01			3.1E+02	4.3E+02	7.2E-01
Antimony	1.6E-02			1.6E-02			3.9E-02		
Cadmium	1.0E+01	2.2E+00	4.8E+00	7.4E+00	1.0E+00	7.4E+00	4.5E+00	2.2E+00	2.1E+00
Chromium	1.0E-01	3.5E-01	2.9E-01	1.0E-01	2.0E+02	5.0E-04	6.4E-01	3.5E-01	1.8E+00
Copper	3.5E+00	1.0E+01	3.5E-01	2.6E+00			1.6E+00	1.0E+01	1.6E-01
Lead	1.8E-01	3.0E+01	5.9E-03	2.2E-01	4.6E+00	4.8E-02	1.0E+00	3.0E+01	3.5E-02
Vanadium	9.2E-02	8.4E+00	1.1E-02	1.0E-01	1.1E+00	9.1E-02	5.6E-01	8.4E+00	6.6E-02
Zinc	3.8E+00	2.0E+01	1.9E-01	2.2E+00			8.2E+00	2.0E+01	4.1E-01
SUMMARY HAZARD INDEX		5.8E+00			7.5E+00				5.3E+00

TBD = Total Body Dose (mg/kgBW-day).

RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix E, Table E-3.

HQ = Hazard Quotient (calculated by dividing TBD by RTV)

NA = Not Available

TABLE E-11
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM CT CONCENTRATIONS OF CPC'S
IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT, Site 17
NAVAL AIR STATION, WHITING FIELD - MILTON, FLORIDA

CHEMICAL	Eastern meadowlark			Red-tail hawk		
	TBD	RTV	HQ	TBD	RTV	HQ
2-Butanone	4.4E-04			2.0E-06	1.7E+02	1.1E-08
Carbon disulfide	1.4E-04			6.4E-07	1.1E+01	5.8E-08
Ethylbenzene	3.9E-03			1.7E-05	2.9E+01	6.0E-07
Methylene chloride	7.1E-04			3.2E-06		1.1E-06
Toluene	3.1E-03			1.4E-05		4.9E-06
Trichloroethylene	7.3E-04			3.3E-06	7.5E+01	4.4E-08
Xylene (total)	3.1E-02			1.4E-04	5.0E+01	2.8E-06
Butylbenzylphthalate	5.3E-03			2.2E-05	4.9E+02	4.5E-08
bis(2-ethylhexyl)phthalate	6.3E-03			2.7E-05	3.5E+00	7.7E-06
2-Methylnaphthalene	1.3E-02			5.7E-05	1.0E+01	5.7E-06
Naphthalene	1.3E-02			5.9E-05	1.0E+01	5.9E-06
Aluminum	1.6E+02			5.5E-01	4.3E+02	1.3E-03
Antimony	2.0E-02			7.3E-05		1.8E-05
Cadmium	4.1E+00	1.0E+00	4.1E+00	6.5E-02	2.2E+00	3.0E-02
Chromium	3.7E-01	2.0E+02	1.9E-03	1.4E-03	3.5E-01	3.9E-03
Copper	1.2E+00			9.0E-03	1.0E+01	9.0E-04
Lead	5.5E-01	4.6E+00	1.2E-01	1.8E-03	3.0E+01	5.9E-05
Vanadium	3.1E-01	1.1E+00	2.8E-01	1.0E-03	8.4E+00	1.2E-04
Zinc	6.2E+00			5.6E-02	2.0E+01	2.8E-03
SUMMARY HAZARD INDEX			4.5E+00		3.9E-02	2.4E-02

TBD = Total Body Dose (mg/kgBW-day).

RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix E, Table E-3.

HQ = Hazard Quotient (calculated by dividing TBD by RTV)

NA = Not Available

APPENDIX F

**SITE 17 REMOVAL ACTION COMPLETION REPORT
(WITHOUT APPENDICES)**

**INTERIM REMEDIAL ACTION/COMPLETION REPORT
FOR
SITES 9, 10, 17, 18, AND 31C
DELIVERY ORDER NO. 0111
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

Prepared for

**DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND**

Under Contract No. N62467-93-D-0936

Prepared by

**BECHTEL ENVIRONMENTAL, INC.
OAK RIDGE, TENNESSEE**

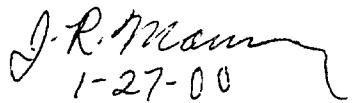
February 2000

REVISION 0

Bechtel Job No. 22567

Engineer's Certification

The engineering services described in this document, *Interim Remedial Action/Completion Report for Sites 9, 10, 17, 18, and 31C at NAS Whiting Field, Milton, Florida*, prepared by Bechtel Environmental, Inc., have been provided in accordance with commonly accepted engineering practice. This report is a summary of environmental sampling, excavation, and soil placement activities performed by Bechtel Environmental, Inc. under contract to the Naval Facilities Engineering Command, Southern Division. The report has been prepared under the responsible charge of the undersigned professional engineer and, based on such engineer's knowledge, information, and belief, accurately summarizes the work performed.



J.R. Manning
1-27-00

J.R. Manning, P.E.
Project Engineer
Florida PE No. 51803
Expires February 28, 2001

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ACRONYMS AND ABBREVIATIONS

ABB-ES	ABB Environmental Services
Bechtel	Bechtel Environmental, Inc.
BTEX	benzene, toluene, ethybenzene, xylenes
COC	compound of concern
EPA	U.S. Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FSCGs	Florida soil cleanup goals
GEL	General Engineering Laboratory
IRA	interim removal action
NAS	Naval Air Station
PAH	polynuclear aromatic hydrocarbons
PCB	poly chlorinated biphenyl
RBC	risk-based concentrations
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RPM	remedial project manager
SCTLs	soil cleanup target levels
SOUTHDIV	Naval Facilities Engineering Command, Southern Division
SPLP	synthetic precipitation leaching procedure
SVOC	semi-volatile organic compounds
TAL	target analyte list
TCL	target compound list
TRPH	total recoverable petroleum hydrocarbons
VOC	volatile organic compound
WFPT	Whiting Field Partnering Team

UNITS OF MEASUREMENT

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
bls	below land surface
ft	foot
ft ²	square foot
in.	inch
m	meter
mg/kg	milligrams per kilogram
ppb	parts per billion
ppm	parts per million
yd ³	cubic yard

1.0 INTRODUCTION

This report describes interim remedial actions performed by Bechtel Environmental Inc. (Bechtel) at Naval Air Station (NAS) Whiting Field in Milton, Florida. The work was performed under Naval Facilities Engineering Command, Southern Division (SOUTHDIV) Delivery Order 0111, dated 30 September 1998. Remedial actions were performed at Sites 9, 10, 17, 18, and 31C. Previous site investigations indicated the presence of organic and/or inorganic chemicals in surface soil at levels exceeding the State of Florida soil cleanup target levels (SCTLs) for industrial and/or residential use. Interim remedial actions at Sites 9, 10, 17, and 18 included installation of a 24-in. permeable soil layer and native grass cover on areas where chemical concentrations in surface soil exceeded the SCTLs for industrial use. Surface soils at Site 31C contained chemicals at levels exceeding the SCTLs for residential use. Interim remedial action at this site included soil excavation and disposal, placement of clean soil, and planting of native grasses.

Bechtel conducted soil sampling and analyses at each of the sites during October and November 1998 to delineate the contaminated areas for interim remedial action and site restoration.

Interim remedial action began 11 January 1999. Tasks included:

- mobilization of Bechtel and its subcontractors, materials, and equipment to the sites;
- excavation of contaminated soil;
- soil sampling and analyses for delineation of contaminated areas, clean confirmation of remediated areas, and supplemental site characterization;
- placement of clean soil; planting of native grass covers; and
- land surveys to establish sample locations and site boundaries.

Demobilization was completed by 31 March 1999. The work was performed in accordance with the Remediation Work Plan dated December 1998 (Bechtel 1998a).

1.1 REPORT ORGANIZATION

Section 1.0 includes a site description, brief site history, performance standards for the interim remedial actions, and scope of work. Subsequent sections include a discussion of the interim remedial action objectives, construction activities, sampling and analysis activities, construction quality control, and final construction inspection. Appendixes include summary data from environmental samples (delineation samples, confirmation samples, and supplemental site characterization samples) as-built drawings with sample locations and coordinates, and project organization and schedules.

1.2 FACILITY LOCATION

NAS Whiting Field is located in Santa Rosa County in the northwest coastal section of the Florida panhandle approximately 5.5 miles north of Milton and 25 miles northeast of Pensacola (Figure 1-1). The base occupies approximately 3,842 acres and consists of two separate airfields—the North Field, a fixed-wing training base, and the South Field, a helicopter training base. Military quarters and industrial and administrative support facilities are situated between the two fields. A complete description of historic operations at the facility is presented in Section 1.3 and Appendix A of the NAS Whiting Field General Information Report (ABB-ES 1998).

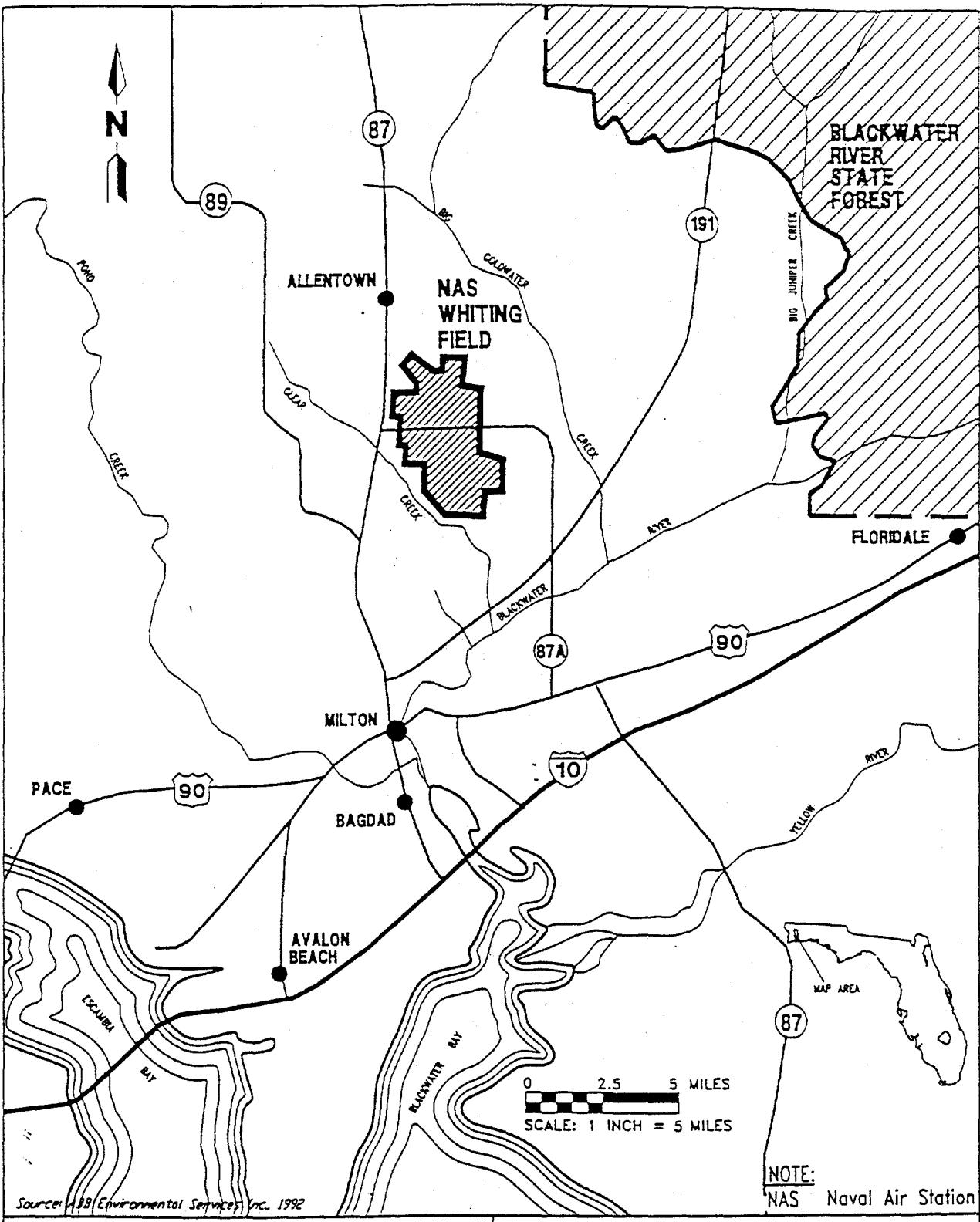


FIGURE 1-1
FACILITY LOCATION MAP

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REMOVAL ACTION
COMPLETION REPORT
SITES 9, 10, 17, 18, AND 31C

NAS WHITING FIELD
MILTON, FLORIDA

Remedial investigations at Sites 9, 10, 17, 18, and 31C (Figure 1-2) were previously performed by SOUTHDIV. All sites are located along Perimeter Road. Remedial investigation fieldwork was performed by Harding Lawson Associates (HLA), [Formerly ABB Environmental Services, Inc. (ABB-ES)] of Tallahassee, Florida. The remedial investigations detected organic and/or inorganic compounds in surface soil at concentrations above the Florida industrial and/or residential direct-exposure SCTLs as listed in the Florida Administrative Code (FAC) Chapter 62-777. Previous operations and waste disposal practices at these sites are the suspected cause of the observed contamination.

1.3 SITE DESCRIPTIONS

Site 9

Site 9 (Figure 1-3) covers approximately 2 acres and is located along the eastern facility boundary near the South Airfield. Waste fuel was reportedly disposed at Site 9 between 1940 and 1960. The risk assessment portion of the remedial investigation (HLA 1999a) indicated surface soil as the only media presenting risks to human health and the environment. Arsenic was identified as the primary chemical of concern exceeding the Florida industrial SCTLs. Subsurface soil was not evaluated because investigation of the site revealed no evidence of buried wastes (HLA 1999a) but is expected to exhibit similar characteristics to surface soil at this site.

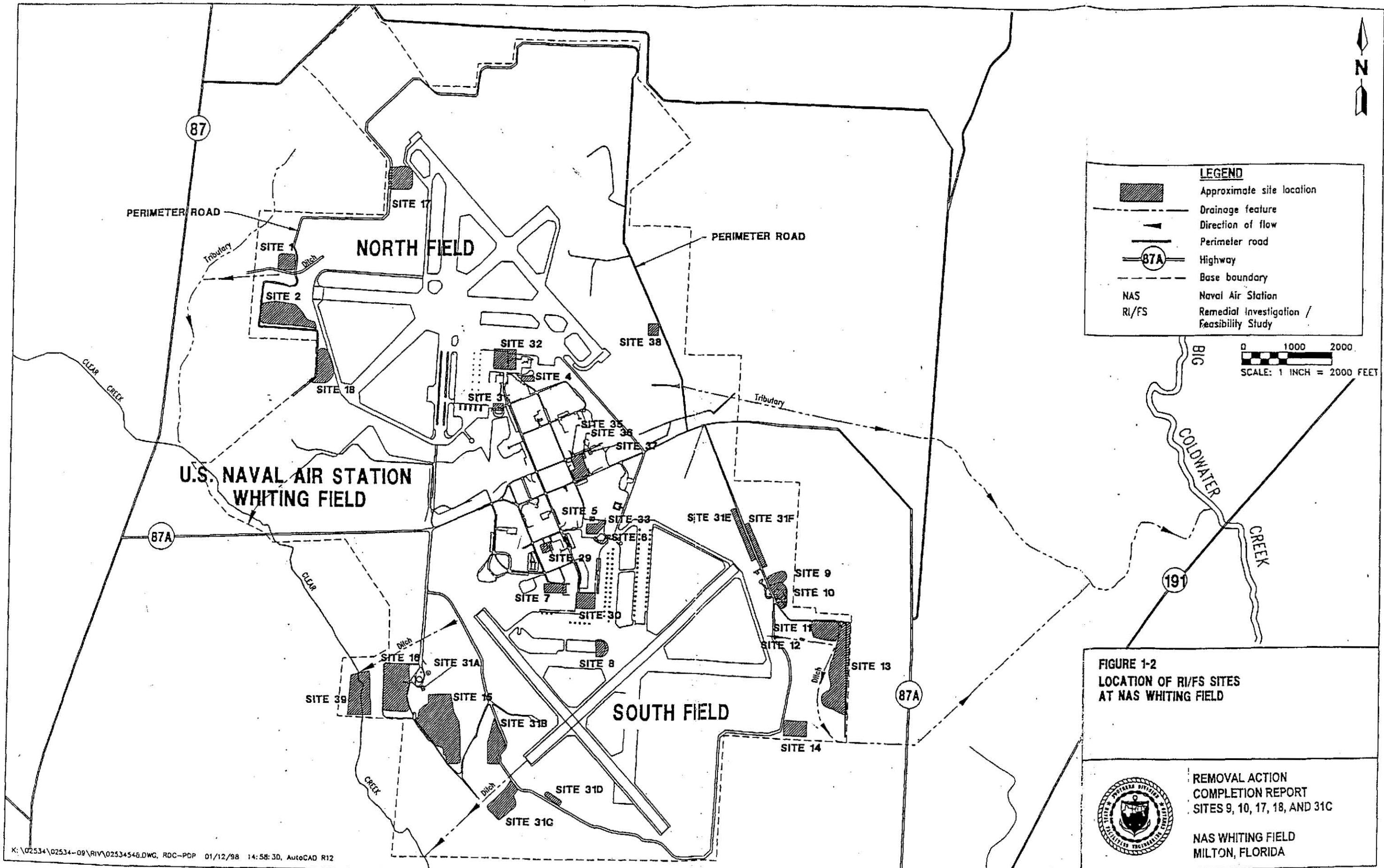
Site 10

Site 10 (Figure 1-3) is contiguous to Site 9 and covers approximately 4 acres. The site was used from 1965 to 1973 for disposal of construction debris, including concrete and asphalt rubble, trees, brush, metal cans, and similar materials not suitable for sanitary landfill disposal. Transformer oil and empty pesticide/herbicide containers were also reportedly disposed of at Site 10 (HLA 1999a). Remedial investigation results from surface soil sampling showed arsenic levels exceeding the site-specific SCTL and carcinogenic polynuclear aromatic hydrocarbons (PAHs) benzo(a)pyrene and dibenzo(a,h)anthracene, at concentrations exceeding the Florida industrial SCTLs. Subsurface soil did not exhibit any organic or inorganic analyte concentrations in excess of the industrial Risk-Based Concentrations (RBC) or Florida Soil Cleanup Goals (FSCG), although aldrin (a pesticide) and arsenic both exceeded the residential RBC.

Sites 17 and 18

Sites 17 and 18 are former crash-crew training areas located along Perimeter Road on the northwestern facility boundary near the North Airfield taxiway (Figures 1-4 and 1-5). The sites cover approximately 2 and 5 acres, respectively. Both sites include shallow depressions, 1- to 2-ft deep, used as burn pits. Remedial investigation results from surface soil sampling at Site 17 show total recoverable petroleum hydrocarbons (TRPH) and arsenic levels exceeding the Florida industrial SCTLs (HLA 1999b). Surface soils at Site 18 also exceeded the Florida industrial SCTLs for TRPH (HLA 1999c).

Subsurface soil at Site 17 contained TRPH at levels in excess of organic screening values but did not exceed the leachability criteria; no other organic criteria were exceeded. Arsenic, chromium, and iron exceeded either EPA Region III industrial RBCs or FAC 62-785 industrial and leachability SCTLs (HLA 1999b). Subsurface soil at Site 18 contained TRPH at levels in excess of organic screening values and also exceeded the leachability criteria; no other organic criteria were exceeded. Arsenic exceeded both the Federal residential screening criteria and Florida residential cleanup criteria, but did not exceed the Federal or Florida industrial criteria (HLA 1999c).



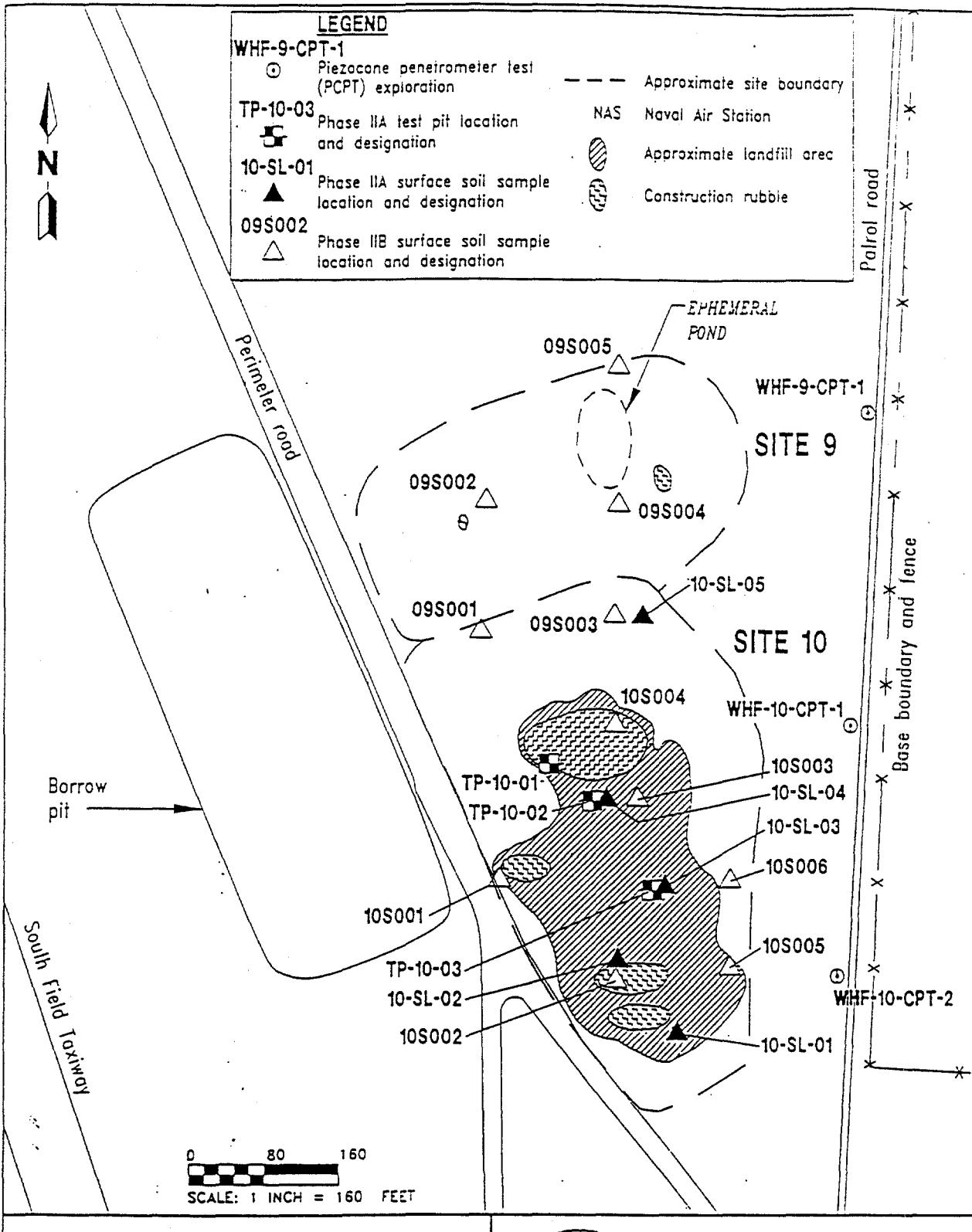


FIGURE 1-3 SITES 9 AND 10
LOCATION OF SURFACE SOIL SAMPLES, TEST PITS,
AND PCPT EXPLORATIONS FOR PHASE IIA AND IIB

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REMOVAL ACTION
COMPLETION REPORT
SITES 9, 10, 17, 18, AND 31C

NAS WHITING FIELD
MILTON, FLORIDA

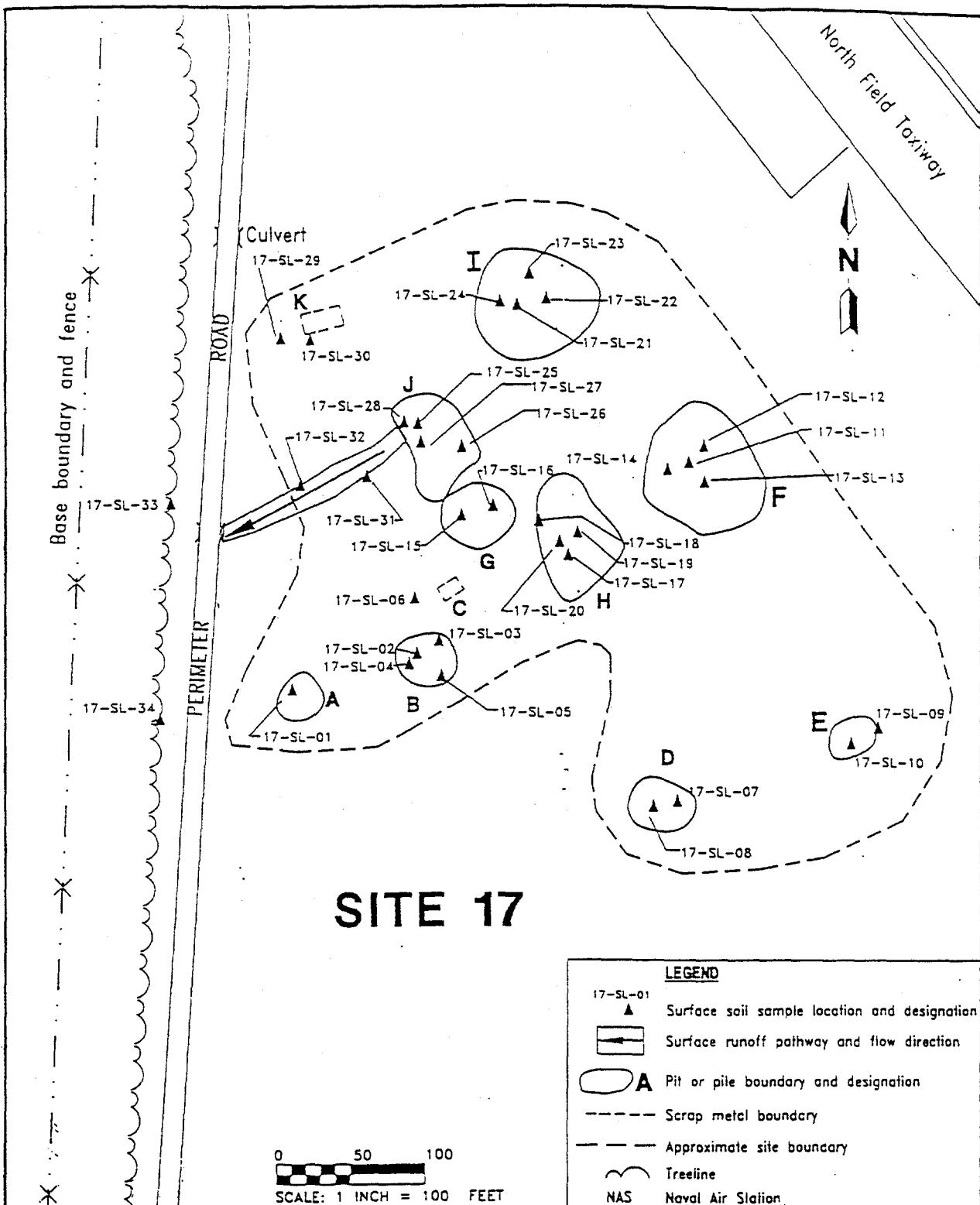


FIGURE 1-4 SITE 17
SURFACE SOIL SAMPLING LOCATIONS



REMOVAL ACTION
COMPLETION REPORT
SITES 9, 10, 17, 18, AND 31C

NAS WHITING FIELD
MILTON, FLORIDA

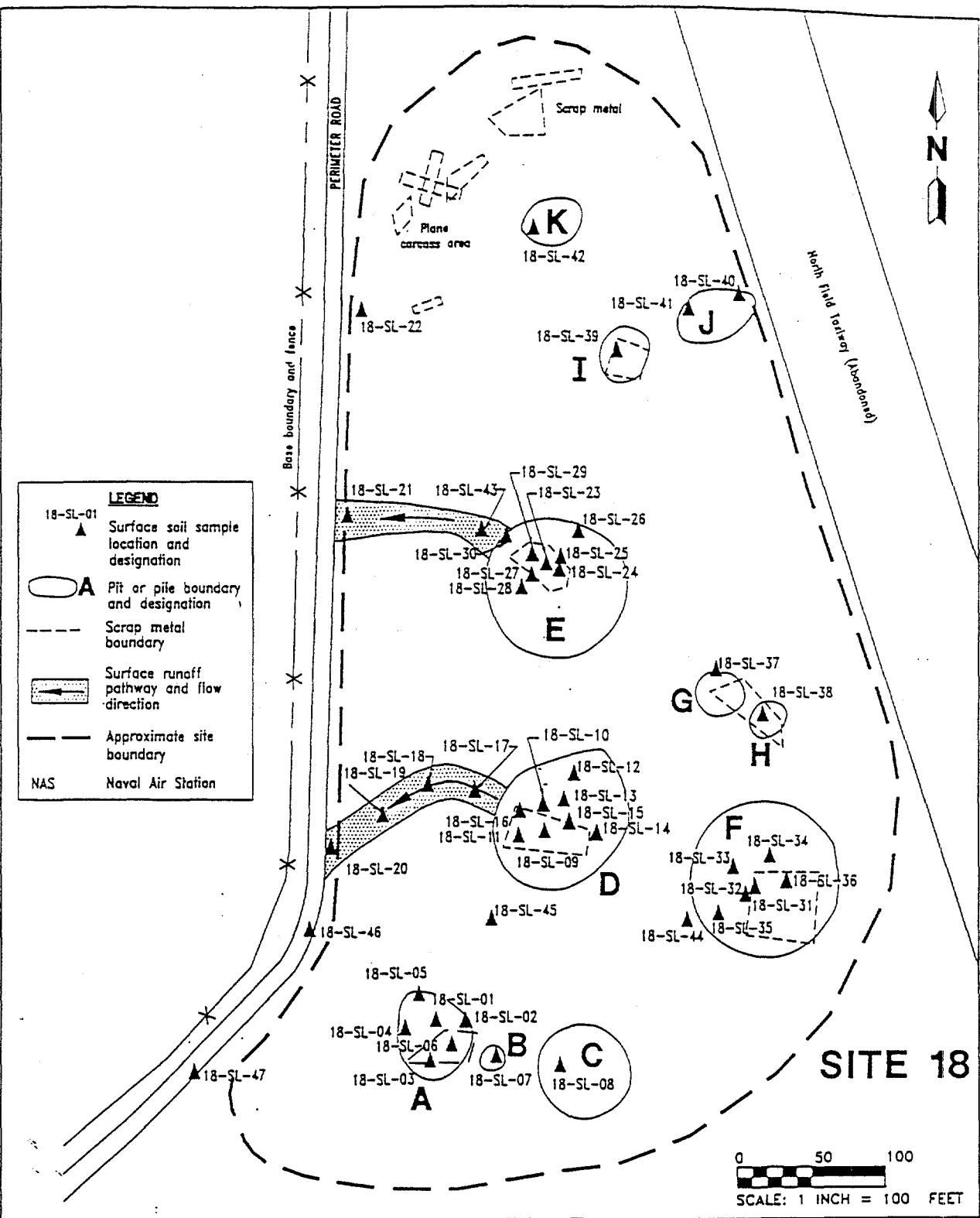
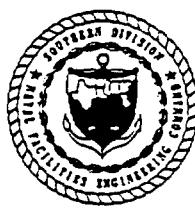


FIGURE 1-5 SITE 18
SURFACE SOIL SAMPLING LOCATIONS

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REMOVAL ACTION
COMPLETION REPORT
SITES 9, 10, 17, 18, AND 31C

NAS WHITING FIELD
MILTON, FLORIDA

Site 31C

The 18-acre site is located southeast of Site 15 and south of Perimeter Road in the South Airfield area (Figure 1-6). The site lies outside the Perimeter Road and consists of grassy terraces bounding a drainage basin. The drainage basin carries runoff from the airfield and the grassy terraces offsite toward Clear Creek to the west. Liquid sludge from the wastewater treatment plant was spread in thin layers (approximately 3 in. or less) on the surface of the ground in the mid-1970s. Approximately 50 separate deposits of sludge were randomly disposed on the site. Minor quantities of concrete, asphalt, and metal rubble from former base operations were also observed at the site, but the time of disposal is not known.

Soil samples were collected from several sludge deposits and surface soil during the Remedial Investigation (RI). Lead concentrations in some samples were found at levels above the residential and industrial FSCGs. Concentrations of barium, copper, mercury, chromium, pesticides, and PCBs were found at levels above residential FSCGs. Subsurface soil did not exhibit any organic or inorganic analyte concentrations above the industrial RBC or FSCGs.

1.4 PERFORMANCE STANDARDS FOR INTERIM REMEDIAL ACTIONS

Performance standards for remedial work plans were based upon the FSCGs when planning and development of interim remedial actions was initiated. Field sampling plans were included, describing sampling for site delineation and confirmation sampling. The performance standards were subsequently adjusted to conform to two sequential changes in Florida Department of Environmental Protection (FDEP) guidance. The first change was from the FSCGs to the SCTLs listed in FAC 62-785, and the second change was to new SCTLs as listed in FAC 62-777. These changes in cleanup criteria were in some instances less stringent for individual chemicals of concern and in others more stringent.

All references to cleanup criteria in this report are based on tables from FAC 62-777 and the site-specific SCG of 4.62 mg/kg for arsenic in surface soil at former covered landfill sites at NAS Whiting Field, as granted in the April 27, 1998 letter from FDEP to the Navy (see Appendix F).

Summaries of site-specific contaminants of concern, maximum concentrations detected, and applicable FDEP SCTLs are in Table 1-1.

The nature and extent of soil contamination at Site 31C was limited to hotspots of sludge deposits at a depth of 12 in. or less. This limited distribution of contamination made it possible to remove hot spots of contaminated soil and restore the site with clean soil, achieving a cleanup to SCTLs for residential use.

Future land use at Sites 9, 10, 17 and 18 is restricted to non-residential use. Sites 9 and 10 are included in the list of former covered landfill sites having a site-specific SCG for arsenic. Since complete removal or treatment of the soil would not be cost effective, the Navy determined these sites could be restricted to non-residential use.

By covering contaminated areas with a minimum of 2 ft of compacted clean fill and implementing administrative controls the Navy would meet Florida's guidance for limiting direct exposure to contaminated soil. Administrative controls include Land Use Controls to require periodic inspection and reporting, restriction of land use, and forbidding excavation or disturbance of soil in the covered areas on the sites of concern.

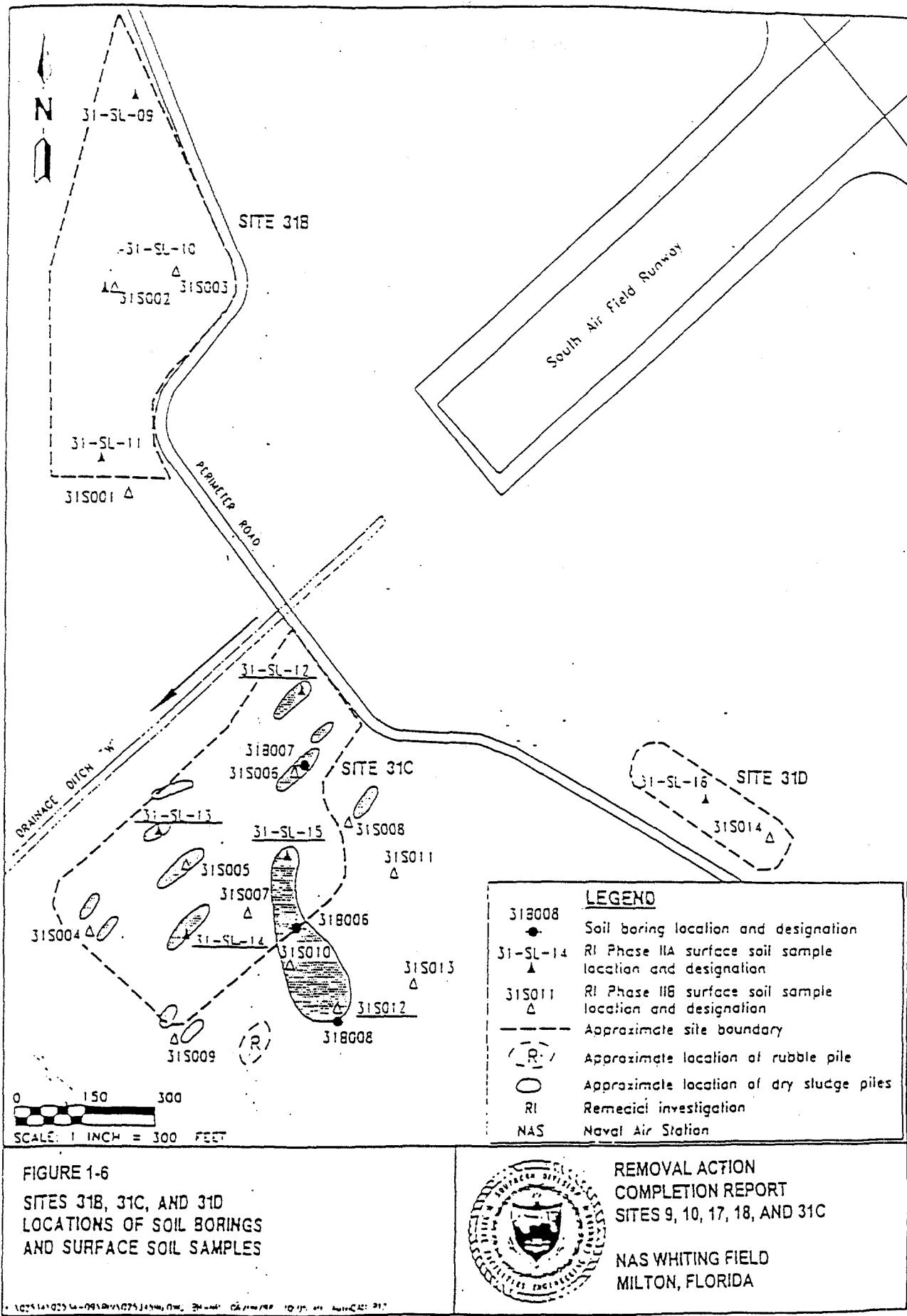


FIGURE 1-6
SITES 31B, 31C, AND 31D
LOCATIONS OF SOIL BORINGS
AND SURFACE SOIL SAMPLES

REMOVAL ACTION
COMPLETION REPORT
SITES 9, 10, 17, 18, AND 31C

NAS WHITING FIELD
MILTON, FLORIDA



Table 1-1
Site-Specific Chemicals of Concern and SCTLs

Site	Chemical of Concern	Maximum Concentration Detected (mg/kg)	Applicable SCTLs (mg/kg)*
9	Arsenic	18	4.62 (1)
10	Arsenic	8.8	4.62 (1)
	Benzo(a)pyrene	3.4	0.5 (2)
	Dibenzo(a,h)anthracene	3.4	5.0 (2)
17	Arsenic	5.9	3.7 (2)
	TRPH	11,700	2,500 (2)
18	Arsenic	1.7J	3.7 (2)
	TRPH	19,300	2,500 (2)
31C	Barium	534	110 (3)
	Chromium	295	210 (3)
	Copper	948	110 (3)
	Lead	1,890	400 (3)
	Mercury	8.8	5.4 (3)
	Arochlor 1260	1.4	0.5 (3)
	Dieldrin	0.120	0.07 (3)

*From FAC 62-777

J = Estimated value

(1) Site-specific SCG for former covered landfill areas (see Appendix F)

(2) Industrial criteria

(3) Residential criteria

1.5 SCOPE OF WORK

The general scope of work for interim remedial actions included:

- Collecting and analyzing surface soil samples to delineate the lateral extent of contaminants in surface soil;
- defining a clean perimeter boundary within which interim remedial activities would be performed;
- covering contaminated surface soil or removal and replacement with clean soil and native grass;
- collecting and analyzing appropriate surface soil confirmation samples to demonstrate remaining surface soil conforms to Florida SCTLs for direct exposure;
- disposal of any hazardous waste removed from the sites;
- collecting and analyzing supplemental surface-soil site-characterization samples where needed;
- performing radiological surveys where appropriate; and
- site restoration.

2.0 INTERIM REMEDIAL ACTION

2.1 REMEDIATION OBJECTIVE

The limited objective for interim remedial actions at NAS Whiting Field is to reduce risk from exposure to surface soil at the subject sites, specifically for maintenance personnel involved in mowing operations, and incidental trespassers walking on the sites. Administrative controls further limit the risk from exposure to surface and subsurface soil at Sites 9, 10, 17, and 18 as discussed in the site-specific RI/Feasibility Study (FS) reports for each site. Reduced risk from exposure to surface soil at Sites 17 and 18 was achieved by covering contaminated areas with twenty-four inches of clean soil and planting native grasses. Reduced risk from exposure to surface soil at Sites 9 and 10 was achieved by using a similar soil cover, combined with administrative controls related to higher site-specific arsenic SCGs.

The same objective at Site 31C was achieved by excavation of contaminated sludge drying areas to a depth of twelve inches or until clean soil was reached, whichever was greater. The excavations were filled with clean soil and covered with sod. All soil excavated at Site 31C was transported offsite and disposed at a subtitle D landfill. Subsurface soil at this site was not found to contain anthropogenic contaminants above residential SCTLs.

Soil used for clean fill and cover material was sampled and analyzed for arsenic content before being brought onto the base. Laboratory results for clean soil are presented in Appendix H.

2.2 INTERIM REMEDIAL ACTIONS AT EACH SITE

The remediation activities associated with each site are summarized below:

Site 9

- Collect delineation and confirmation surface soil samples for arsenic analysis;
- Survey soil sample locations and pre-restoration grade;
- Define boundaries of site, and area to be covered;
- Remove/mulch heavy vegetation overgrowth and trees as necessary;
- Construct 2-ft-thick permeable fill cover;
- Apply Bahia grass seed and irrigate; and
- Survey site restoration grade elevations.

Site 10

- Collect surface soil samples for immunoassay testing for carcinogenic PAHs;
- Collect delineation and confirmation surface soil samples for arsenic and carcinogenic PAH analyses;
- Survey soil sample locations and pre-restoration grade;
- Define boundaries of site, and area to be covered;
- Remove/mulch heavy vegetation and trees as necessary;

- Reduce and grade existing rubble piles;
- Construct 2-ft-thick permeable cover with clean soil;
- Apply Bahia grass seed and irrigate; and
- Survey site restoration grade elevations.

Sites 17 and 18

- Collect surface and subsurface soil samples for immunoassay testing for TRPH;
- Collect delineation and confirmation surface soil samples for TRPH, TRPH leachate , and arsenic (Site 17 only) analyses;
- Survey all sample locations and pre-restoration grade;
- Define boundaries of site, and area to be covered;
- Construct 2-ft-thick permeable cover with clean soil;
- Install Bahia grass sod and irrigate; and
- Survey site restoration grade

Site 31C

- Collect and analyze delineation and confirmation surface soil samples for metals, pesticides, and polychlorinated biphenols (PCBs) analyses;
- Identify and define boundaries of site, and sludge drying areas for removal;
- Excavate sludge drying areas where residential direct-exposure soil SCTLs were exceeded, to a depth of 12-in. below grade or greater;
- Excavate all other sludge drying areas exhibiting distressed vegetation, to an approximate depth of 6-in. below grade;
- Collect and analyze confirmation samples from side-walls and bottoms of excavated areas were SCTLs were exceeded;
- Collect and analyze additional characterization samples from Site 31C to fill data gaps;
- Collect and analyze sample from excavated soil stockpile for waste characterization;
- Survey all confirmation and remedial investigation sample locations and site topography;
- Back-fill excavated areas with clean soil;
- Transport and dispose of all excavated soil at appropriate waste disposal facilities as determined from waste characterization results; and
- Install Bahia grass sod and irrigate.

2.3 INTERIM REMEDIAL ACTION CONSTRUCTION ACTIVITIES

Interim remedial action construction activities included mobilization, soil excavation and disposal, backfilling clean soil, and planting native grass covers at the subject sites. Table 2-1 provides a summary of the material quantities handled at each site.

Table 2-1
Summary of Material Quantities Handled

Site	Soil Excavated (yd ³)	Soil Disposed (ton)	Clean Soil Backfill (yd ³)	Vegetative Cover (ft ²)
Sites 9 and 10	None	None	15,940	168,880 (2)
Site 17	None	None	8,480	61,150 (1)
Site 18	None	None	11,040	106,980 (1)
Site 31C	<u>1,635</u>	<u>1,386</u>	<u>1,920</u>	<u>356,400 (1)</u>
Totals	1,635	1,386	37,380	693,415

Notes

- (1) Bahia sod
- (2) Bahia seed mix

2.3.1 Mobilization

Mobilization activities at NAS Whiting Field began on 11 January 1999. These activities included arrival of personnel at the jobsite; initiation of a pre-construction meeting and notifications; delivery of construction equipment, tools, and materials; and setup of a field office. NAS Whiting Field provided Room 200 of Building 1464 for a temporary field office. This resulted in a cost savings of approximately \$5,000 to the project. Bechtel mobilized a Site Superintendent and a Safety and Health Representative/Quality Assurance Representative to perform the fieldwork.

2.3.2 Pre-Construction Activities

Before field activities began, a pre-construction meeting was held by Bechtel on 19 January 1999 at the Public Works Building at NAS Whiting Field; the meeting included representatives from base public works, engineering, safety and security, fire protection, and environmental departments. Bechtel met separately with representatives from NAS Whiting Field maintenance and morale, welfare, and recreation departments to inform them of the scope of work and schedule.

Bechtel personnel performed all the necessary utility notifications and obtained clearances before the start of excavation activities. The base operating services personnel were notified in advance of construction startup to obtain utility clearances and locate all buried interferences. Notifications were given to the base Public Works Department, the resident officer in charge of construction (ROICC), and facility operational personnel.

2.3.3 Excavation and Disposal

Excavation and disposal activities were limited to work performed at Site 31C. Equipment used included a John Deere (JD) 544A loader, Volvo L70C loader, a Daewoo 139 excavator, and a JD 20L excavator. The work was performed by Florida Waste Services of Tampa, Florida. During 20 January through

17 February 1999, approximately 1,635 yd³ of soil was excavated and stockpiled at Site 31C. A site survey showing the excavated areas is provided as Drawing 419-DD-005 in Appendix A. Construction photographs are provided in Appendix B.

Waste generated during the site restoration activities was managed in accordance with the *Environmental Response Action Contract Waste Management Plan* (Bechtel 1995). Waste was classified based on analytical data collected during the excavation and confirmation sampling activities. All sample results were reviewed prior to release of waste soil for disposal. Waste manifests were signed by the NAS Whiting Field Environmental Coordinator. From 1 March through 5 March 1999, all stockpiled soil was transported and disposed at the Browning Ferris Industries Timberlands Landfill located at Brewton, Alabama. Approximately 1,386 tons of soil, dried sludge, and vegetation (grass, weeds, and roots) were disposed. Copies of the waste tracking log and waste manifests are provided in Appendix C.

2.3.4 Clean Soil for Fill and Cover

Approximately 37,380 yd³ of clean fill was used during construction activities for all sites. The 24-in. soil cover for Sites 9, 10, 17, and 18 consisted of an 18-in. layer of red, sandy fill and a 6-in. layer of brown fill for topsoil. Earth-moving equipment used to spread and compact the soil included a JD 650 dozer, a JD 644G loader, and an Ingersol Rand SD40D vibratory compactor. The sides of the backfill cover were sloped to the existing grade at a 12-ft horizontal to 1-ft vertical slope. Fill for Site 31C was used to bring the excavated areas back to original grade. Fill soil was provided by Roberson Excavation, Inc., located at 7980 Highway 87 North, Milton, Florida. A summary of the quantities and activity dates for each site is provided below.

Sites 9 and 10

Site preparation activities included clearing and grubbing and leveling existing debris piles. Tri-State Tree Service of Pensacola, Florida performed clearing and grubbing during 22 January through 24 January 1999. Mulched wood material was delivered to the base golf course for landscape purposes. Tree trunks greater than 4 in. in diameter were stockpiled along the edge of Perimeter Road for reclamation. Several debris piles of concrete, asphalt rubble, soil, and minor amounts of metal were leveled using the earth moving equipment.

Approximately 15,940 yd³ of backfill were placed and compacted during 15 February through 11 March 1999. Drawing 419-DD-001 in Appendix A shows the outer limits of the 24-in. soil cover and the additional soil used for blending to natural contours. As a result of applying the 24-in. soil cover to the sites, it was necessary to reconstruct the surface protection for two existing groundwater monitoring wells. A 36-in.-diameter Hancor corrugated polyethylene pipe and four 4-in.-diameter steel guard posts were installed at each well. The pipe was placed around the well, and cement was placed inside the base of the pipe to stabilize the pipe and allow rainwater to drain away freely. The well-protection detail is shown in Figure 2-1.

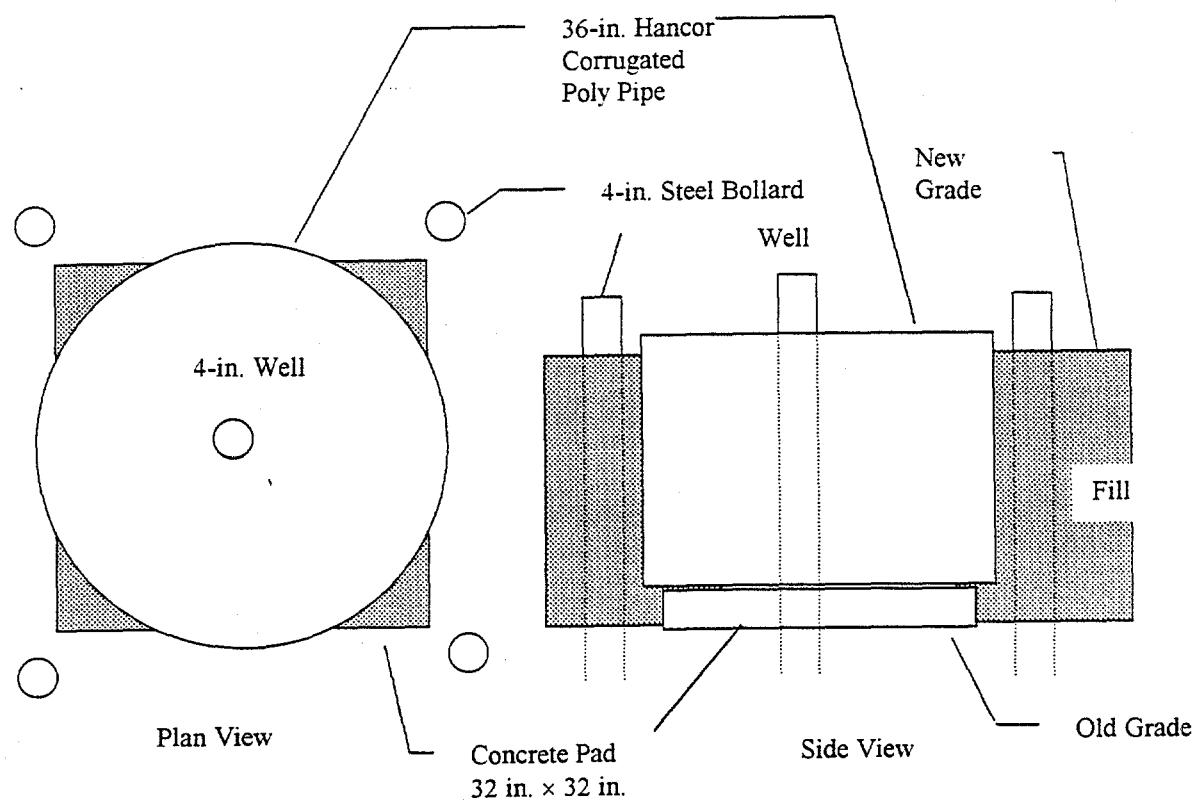


Figure 2-1 Well Protection Detail

Site 17

Approximately 8,480 yd³ of clean fill were placed and compacted from 28 January through 8 February 1999. Drawing 419-DD-002 shows the outer limits of the 24-in. soil cover and the additional soil used for blending to natural contours.

Site 18

A total of 11,040 yd³ of clean fill were placed and compacted during 19 January through 27 January 1999. Drawing 419-DD-003 shows the outer limits of the 24-in. soil cover and the additional soil used for blending to natural contours.

Site 31C

A total of 1,920 yd³ of clean fill were placed in excavations at site 31C and graded to original site contours. The soil was compacted using a front-end loader. Drawing 419-DD-005 shows areas where soil was removed and replaced with clean fill.

2.3.5 Revegetation of Filled and Covered Areas

Approximately 168,130 ft² of native grass were planted at Sites 17 and 18, using Bahia grass sod supplied and installed by Eagle Golf and Turf of Milton, Florida. Approximately 356,400 ft² of native grass were planted at Site 31C by Florida Waste Services of Tampa, Florida. Approximately 168,880 ft² of clean fill at Sites 9 and 10 were covered by planting Bahia grass seed, using subcontract services of Allentown Community Farm Center, of Jay, Florida.

2.3.6 Site Survey

Land surveying services were provided by A-1 Surveying of Milton, Florida. Site boundaries, elevations, soil sample locations, and the top and toe of the backfill slopes were surveyed at each site. As-built drawings of the site surveys are provided in Appendix A.

2.3.7 Demobilization

Demobilization included decontamination of equipment, cleaning work areas, and removing equipment, supplies, and materials from the work sites and office areas.

3.0 SAMPLING AND ANALYSIS RESULTS

To minimize the area of site restoration, Bechtel developed a plan to confirm and delineate the extent of contaminated areas exceeding the applicable Florida SCTLs. The plan included review of existing analytical data and planning and implementing sampling, immunoassay testing, and laboratory analyses of surface soils at each site. Results from this effort defined the areas requiring remediation. Where data gaps were identified by previous RI reports, additional characterization samples were collected to supplement the earlier site investigations. A radiological walkover survey was performed at Sites 17 and 18 to look for possible radium-painted dials and instruments from airplane parts that had been used for crash crew training.

3.1 DELINEATION, CONFIRMATION AND CHARACTERIZATION SAMPLING

Delineation and confirmation sampling were conducted at all sites during October and November 1998. Additional delineation, confirmation, and characterization sampling was conducted during mobilization in January and February 1999. Surface soil samples were collected from the ground surface to a depth of 12 in. below grade. Samples were collected for field screening using immunoassay testing, and for organic and inorganic chemical analyses by offsite laboratories. Samples collected during October and November 1998 were submitted to ENCO Laboratories of Orlando, Florida, and samples collected during January and February 1999 were submitted to General Engineering Laboratory of Charleston, South Carolina.

Whenever appropriate, delineation samples were used as confirmation samples (example—clean perimeter samples) to avoid expense of redundant sampling. Characterization samples were collected to fill data gaps identified by the Site 31C RI, to supplement previous sampling.

Samples referred to in this report as Level IV were analyzed by GEL using U.S. Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) Routine Analytical Services (RAS). Although not currently performing EPA contract work, GEL formerly performed CLP work and still performs analytical procedures meeting the quality standards of the CLP. These procedures require rigorous QA/QC protocols and documentation. The samples were analyzed using the CLP Statements of Work (SOWs) for organic and inorganic compounds. The Level IV data were provided by the laboratory in complete packages, including raw data. Data were fully validated, and qualifiers added to the results.

Quality control requirements included one matrix spike and one laboratory duplicate analyzed per 20 samples, per matrix for inorganic parameters. One matrix spike, matrix spike duplicate pair was analyzed per 20 samples, per matrix for organic parameters. Field QC was at a frequency of 5%, or more. Field duplicates were collected at a frequency of 1 field duplicate pair per 20 samples, per matrix. Rinsate blanks were taken at a minimum of 1 per 20 samples, per matrix.

The sample results were added to the electronic database for NAS Whiting Field environmental samples.

Samples referred to in this report as Level III were analyzed by GEL and ENCO laboratories, using EPA procedures, some of which are equivalent to CLP RAS, but without the CLP requirements for documentation. These samples are referred to in this report as Level III. Sample results for these samples were thoroughly evaluated for QC purposes, but not validated because of less documentation required in the data packages from the laboratory.

A summary of the sampling activities at each site is provided below. Representative sample results are presented in tables in Appendix D, including field screening (immunoassay) data and laboratory data. These data demonstrate confirmation of the effectiveness of the interim remedial actions (IRAs) performed at these sites. Complete analytical data for these sites, including laboratory methods used for sample analyses are included in the electronic data submittal provided under separate cover. The electronic data include all non-detects for analytes sampled and analyzed for, but not reported in the tables in Appendix D. Results are reported on a dry weight basis.

Site 9

Seventeen surface soil samples (09S006 through 09S022) were collected at Site 9 for arsenic analysis; however, two of the samples were inadvertently collected on Site 10. Sample locations are shown on Figure 3-1. Sample results were used to define the perimeter for placement of the soil cover. Arsenic

results ranged from 1.0 mg/kg to 11.2 mg/kg. Sample locations where the results exceeded the site-specific SCG of 4.6 mg/kg were offset 10 to 20 ft toward undisturbed areas, and another surface soil sample was collected and analyzed. The process was followed until arsenic results were below the site-specific SCG. Sample results are listed in Table D-1 and coordinates are shown on as-built drawing 419-DD-001 in Appendix A.

Site 10

Twenty-five surface soil samples were collected at Site 10. Arsenic sample locations are shown on Figure 3-1 and immunoassay and PAH sample locations are shown on Figure 3-2. Eleven samples (10S007 through 10S015, 10S020, and 10S021) were collected and submitted for arsenic analysis. Ten samples (10IS01 through 10IS10) were used for immunoassay testing for carcinogenic PAHs, and four samples (10S016 through 10S019) for semi-volatile organic analyses to confirm immunoassay results.

Field screening sampling and fast-turnaround laboratory analyses were used to define the perimeter for placement of the soil cover. Immunoassay field test kits were used to determine if soil samples contained PAHs at levels likely to be above the SCTLs for individual carcinogenic PAHs. Total carcinogenic PAHs detected by laboratory analysis ranged from none detected to 17,000 mg/kg. Arsenic concentrations ranged from 0.8 mg/kg to 6.0 mg/kg. Sample locations where arsenic results exceeded the site-specific SCG of 4.6 mg/kg or PAH results exceeded SCTLs were offset 10 to 20 ft toward undisturbed areas, and subsequent samples were collected and analyzed until a clean perimeter was established. Sample results are listed in Tables D-2 and D-3 and coordinates are shown on as-built drawing 419-DD-001 in Appendix A.

Site 17

A radiological survey was performed before collecting soil samples at Site 17 to detect low levels of radiation that may result from radium-painted instruments or dials from debris in the former fire pits. A 10-m by 10-m grid was established across the site, and background radiological readings were collected at the beginning of the survey. Each grid was transected and surveyed in 1-meter swaths, with all readings recorded in a field logbook. All readings were less than twice background criteria. Radiological walkover survey instructions and a copy of the field notes are provided in Appendix E.

Soil sample results were used to establish the perimeter for placement of the clean soil cover and to demonstrate TRPH was not leaching from soils within the former fire pits. A total of 52 samples were collected at Site 17 during October 1998. Sample locations are shown on Figures 3-3 and 3-4.

Thirty-seven screening samples (17-IA-01 through 17-IA-37) were collected from the former fire pits and along the perimeter of the fire pits where previous sampling showed TRPH concentrations above the 2,500-ppm criteria. These samples were used for immunoassay testing (field screening) for total benzene, toluene, ethyl-benzene, and xylenes (BTEX). Samples from seven of the immunoassay locations were also submitted to an offsite laboratory for TRPH analysis (17-SL-35 through 17-SL-41) to confirm the consistency of immunoassay test results and to confirm the clean perimeter. Immunoassay results for BTEX ranged from none detected to 30.67 mg/kg. Laboratory results of chemical analysis for TRPH ranged from none detected to 130 mg/kg.

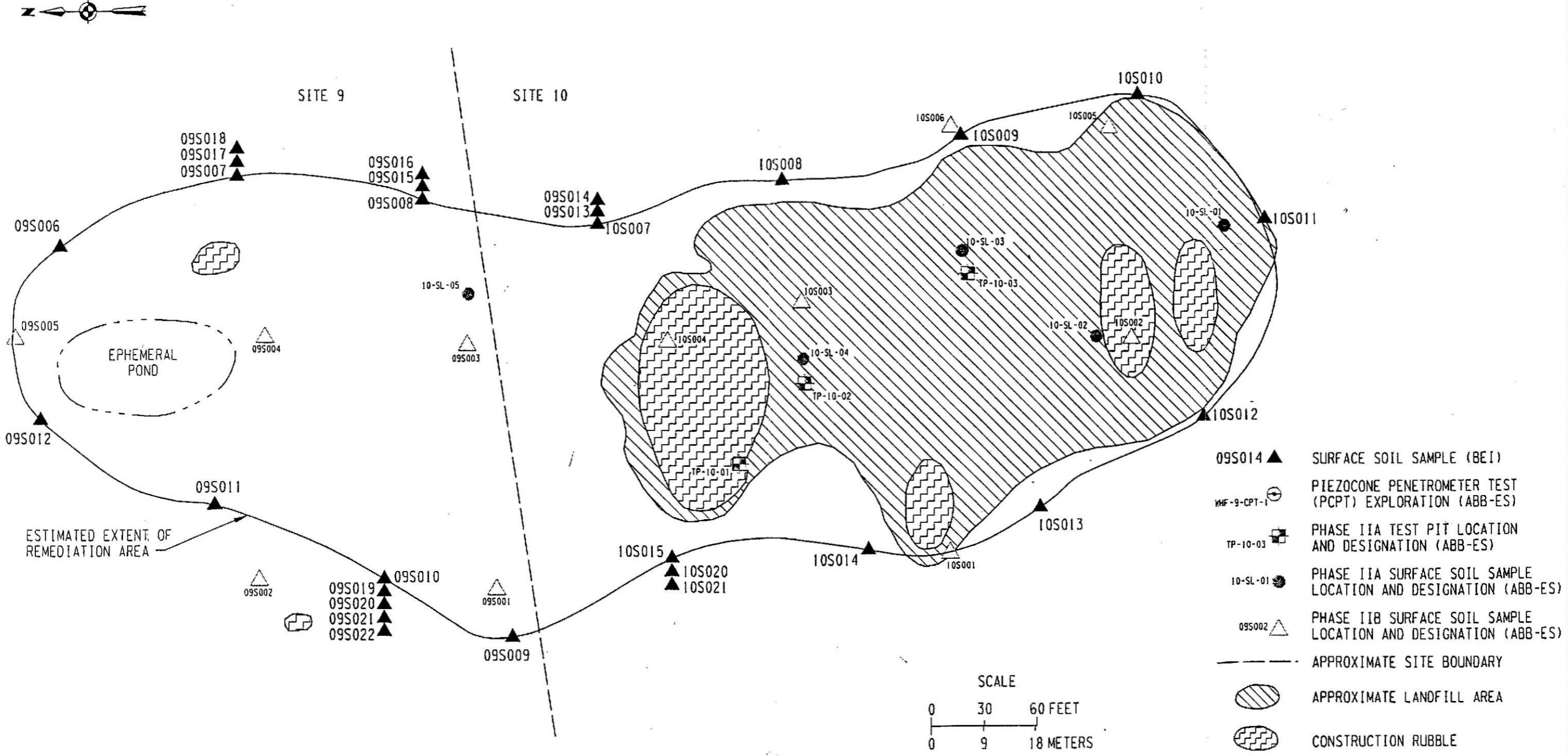
Three surface soil samples (17-SL-42 through 17-SL-44) were collected from within the fire pits for TRPH leachate testing using the synthetic precipitation leaching procedure (SPLP). Laboratory SPLP leachate test results indicated no TRPH was detected.

WHF-9-CPT-1

WHF-10-CPT-1

WHF-10-CPT-2

NAS WHITING FIELD
INTERIM REMOVAL ACTION COMPLETION REPORT
SITES 9,10,17,18, AND 31C - 1999

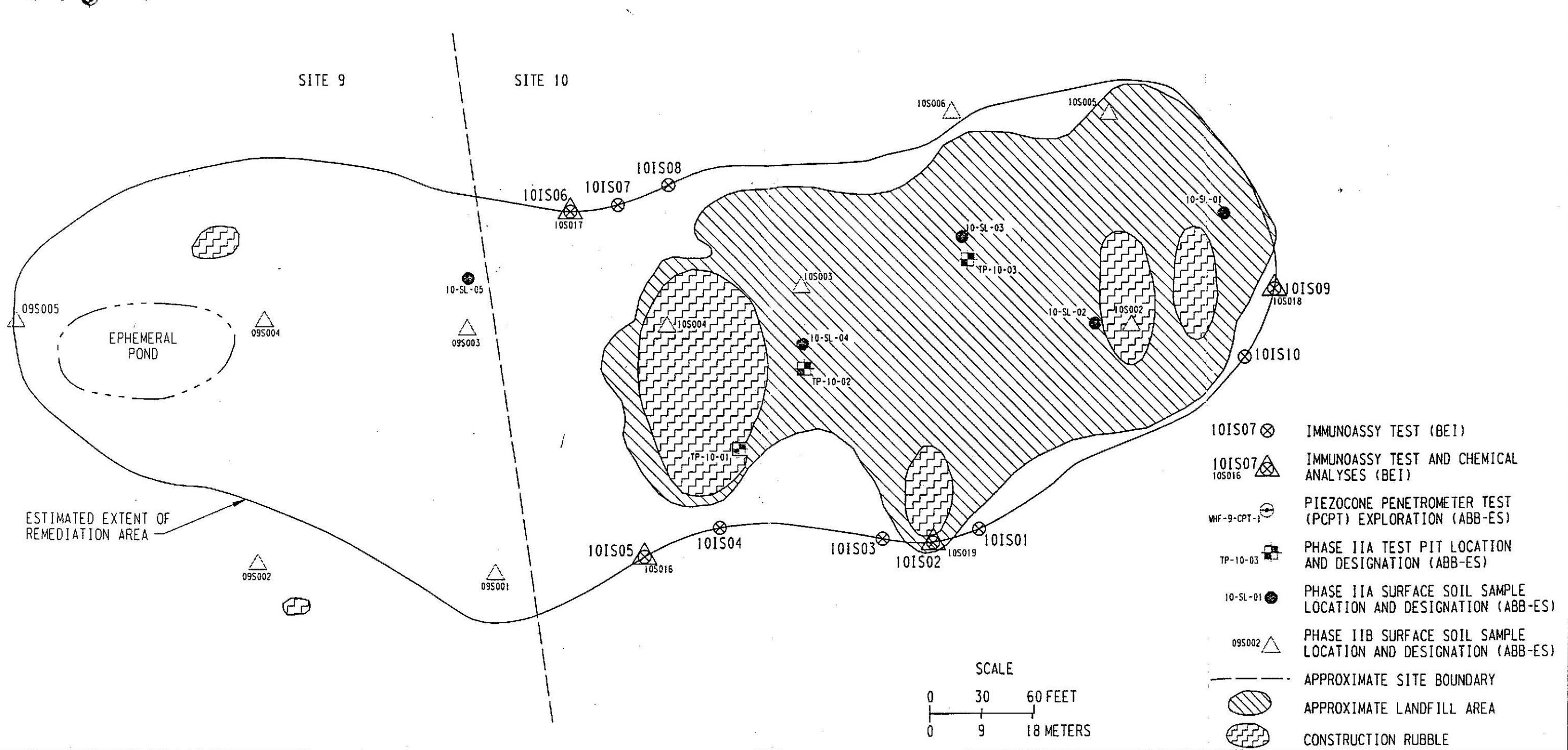


WHF-9-CPT-1

WHF-10-CPT-1

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NAS WHITING FIELD
INTERIM REMOVAL ACTION COMPLETION REPORT
SITES 9,10,17,18, AND 3IC - 1999



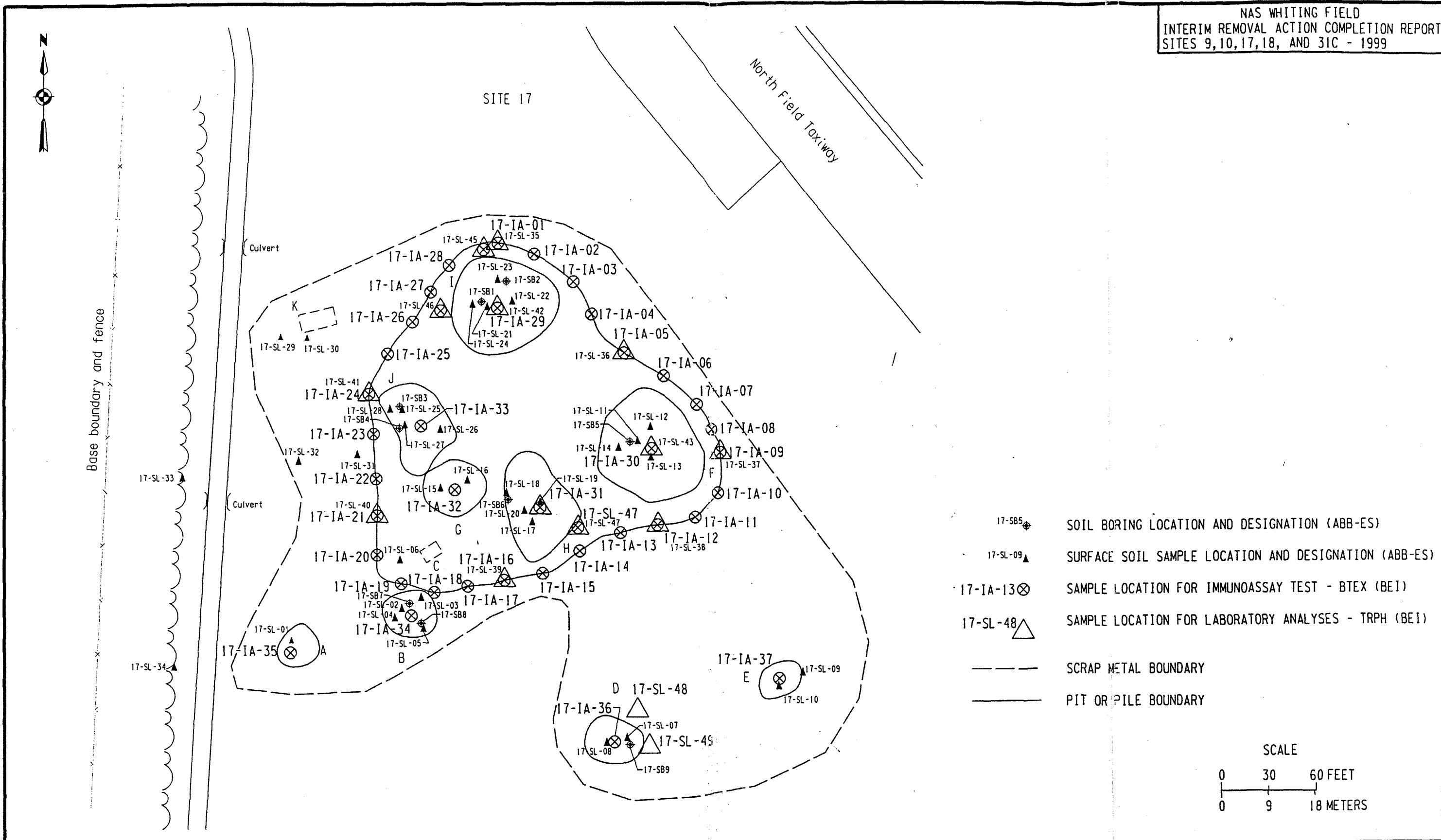
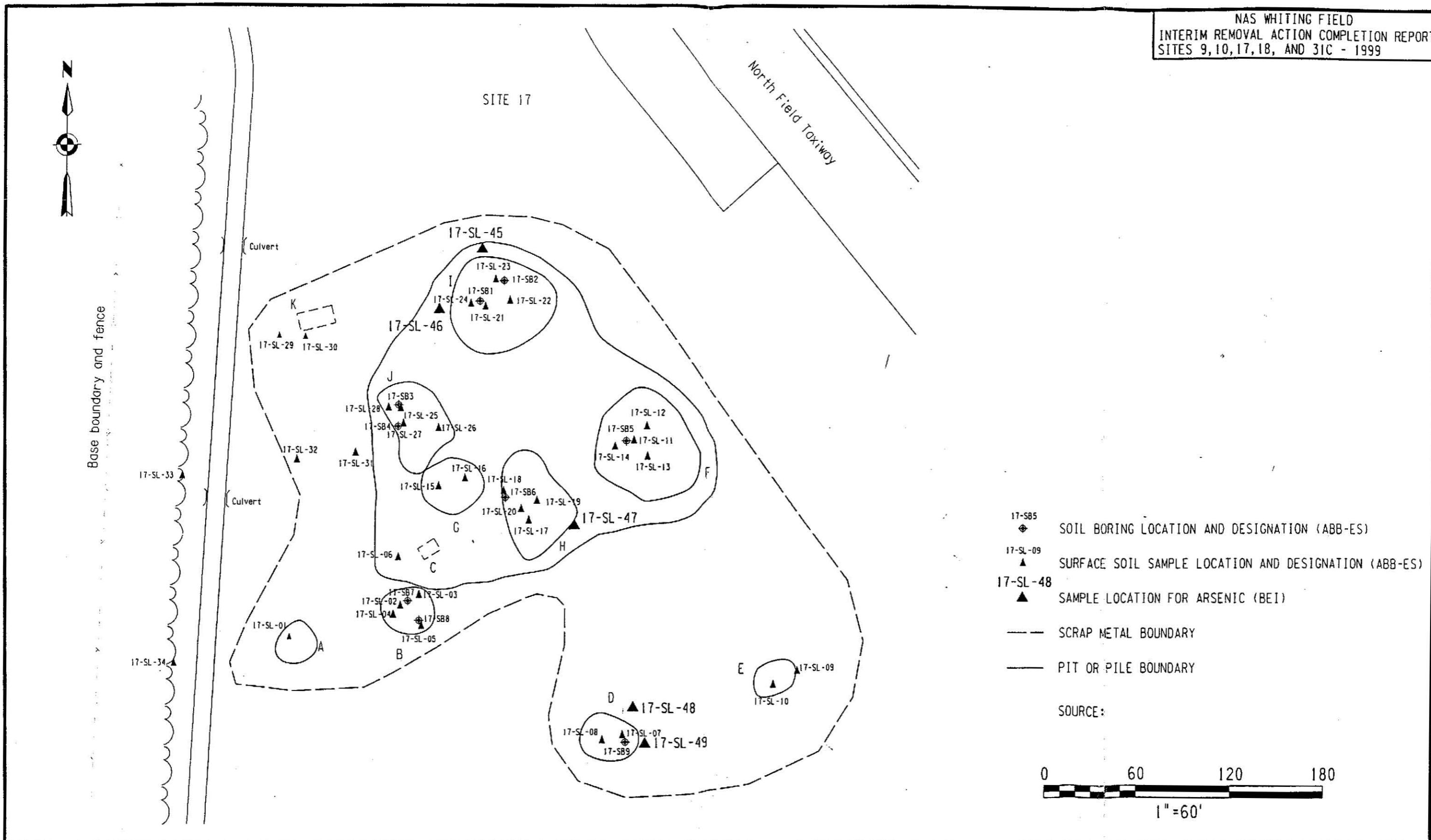


FIGURE 3-3
SURFACE SOIL SAMPLING LOCATIONS
FOR TRPH AND BTEX AT NAS WHITING FIELD - SITE 17



19 AUG 1999
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FIGURE 3-4
SURFACE SOIL SAMPLING LOCATIONS FOR ARSENIC
AT NAS WHITING FIELD - SITE 17

Five samples (17-SL-45 through 17 SL-49) were collected for laboratory analysis from areas where arsenic had been previously detected during the site RI. Laboratory results ranged from 0.60 mg/kg to 2.2 mg/kg. The cleanup criteria for all contaminants including arsenic at this site were the SCTLs in FAC 62-777.

The SPLP results demonstrated there would be no leaching of TRPH into groundwater in excess of Florida Groundwater Cleanup Target Levels if a permeable soil cover was applied to prevent direct exposure to surface soil.

Site 18

A radiological survey, as described above, was conducted at Site 18 before soil samples were collected. All survey readings were below the twice background criteria.

Soil sample analytical results were used to establish an outer perimeter for the soil cover and to demonstrate TRPH was not leaching from soils within the former fire pits. A total of 51 samples were collected at Site 18 during October 1998. Sample locations are shown on Figure 3-5. Forty-eight samples (18-IA-01 through 18-IA-48) were collected from the former fire pits and along the perimeter of the fire pits where previous sampling detected TRPH concentrations above the 2,500 mg/kg criteria. These samples were used for immunoassay testing for BTEX. Immunoassay test results for BTEX in surface soil samples ranged from 0.22 mg/kg to 1,441.6 mg/kg. Eight of the immunoassay locations were also submitted for TRPH analysis (18-SL-48 through 18-SL-55) to confirm immunoassay results. According to laboratory results, no TRPH was detected in surface soil samples.

Three surface soil samples (18-SL-56 through 18-SL-58) and two subsurface soil samples (18-SB-11 and 18-SB-12) were collected for TRPH leachate testing using the SPLP method. The subsurface samples were collected at a depth of 10 ft bls to 12 ft bls from locations previously sampled by HLA, where TRPH had exceeded SCTLs. The SPLP analytical results for TRPH samples collected from surface soil in the former fire pits and from subsurface soil collected at a depth of 11 to 12 ft bls in the fire pits, were below leachate criteria. TRPH leachate results ranged from none detected to 400 µg/L, well below the limit of 5,000 µg/L for groundwater.

The SPLP results demonstrated there would be no leaching of TRPH into groundwater in excess of Florida Groundwater Cleanup Target Levels if a permeable soil cover was applied to prevent direct exposure to surface soil.

Site 31C

A total of 210 surface soil samples were collected at Site 31C. Samples were collected for screening, delineation, confirmation, and supplemental RI site characterization. Samples are summarized by category in Table 3-1.

Table 3-1
Soil Sampling Summary Site 31C

Area	Number Samples	Location IDs	Analyses
Delineation	60	31S020 - 31S079	
Drainage Basin Screening	10	31080 - 31089	Metals, Pesticides, PCBs
31C Remote Area	3	31090 - 31092	Metals, Pesticides, PCBs
Excavation Confirmation	82	31093C - 31174C	Metals, Pesticides, PCBs
Characterization	35	31175C - 31198C 31204C - 31214C	Metals, Pesticides, PCBs
Drainage Basin RI	20	31199C - 31203C	Metals, Pesticides, PCBs, SVOCs, VOCs

During October and November 1998, 60 soil samples (31S020 through 31S079) were collected for delineation sampling of sludge areas. The samples were analyzed at Level III for metals, pesticides, and PCBs. Analytical results showed 12 locations where copper and/or barium concentrations exceeded the residential direct-exposure soil SCTLs. Copper results exceeding the residential SCTLs ranged from 120 mg/kg to 420 mg/kg, and one location showed barium at 190 mg/kg. These locations were selected for excavation and site restoration. Sample locations and areas exceeding the SCTLs are shown on Drawing 419-DD-004 in Appendix A. Sample analytical results are listed in Tables D-7 and D-8 in Appendix D.

An additional 150 soil samples were collected from Site 31C during the interim remedial action field activities in January and February 1999. Confirmation samples were collected from the sidewalls and bottom of excavated areas to demonstrate the removal of all contaminated soil. Supplemental characterization samples were collected to fill data gaps previously identified by the Site 31C RI. Characterization samples were collected concurrently with site delineation and confirmation samples, to expedite complete characterization of the site and take advantage of mobilized field crews.

Additional characterization of surface soil was required for the main flow channel of the drainage basin to look for water-transported contamination. To obtain an early indication of the potential need for excavation of soil from the drainage basin, 10 screening samples were collected from the main flow path in the drainage basin to test for the same site-specific chemicals of concern (COCs) previously found in the sludge deposits. The samples were submitted for Level III 48-hour turn around.

An additional 20 surface soil samples were later collected from locations in the deepest part of the drainage basin for site characterization using Level IV analysis methods. The samples were collected on a line from the road to the steel erosion-control bulkheads at the down-stream edge of the site. Five of the samples were analyzed for the target compound list (TCL) for volatile organic compounds (VOCs), semi-VOCs (SVOCs), pesticides, herbicides, and PCBs, plus the target analyte list (TAL) for metals. The remaining 15 samples were analyzed for the site specific COCs. Results for all samples collected in the drainage basin were below the residential direct-exposure soil SCTLs. Analytical results for drainage basin samples are listed in Tables D-13 through D-16 in Appendix D, and locations are shown on Drawings 419-DD-004 and -005 in Appendix A.

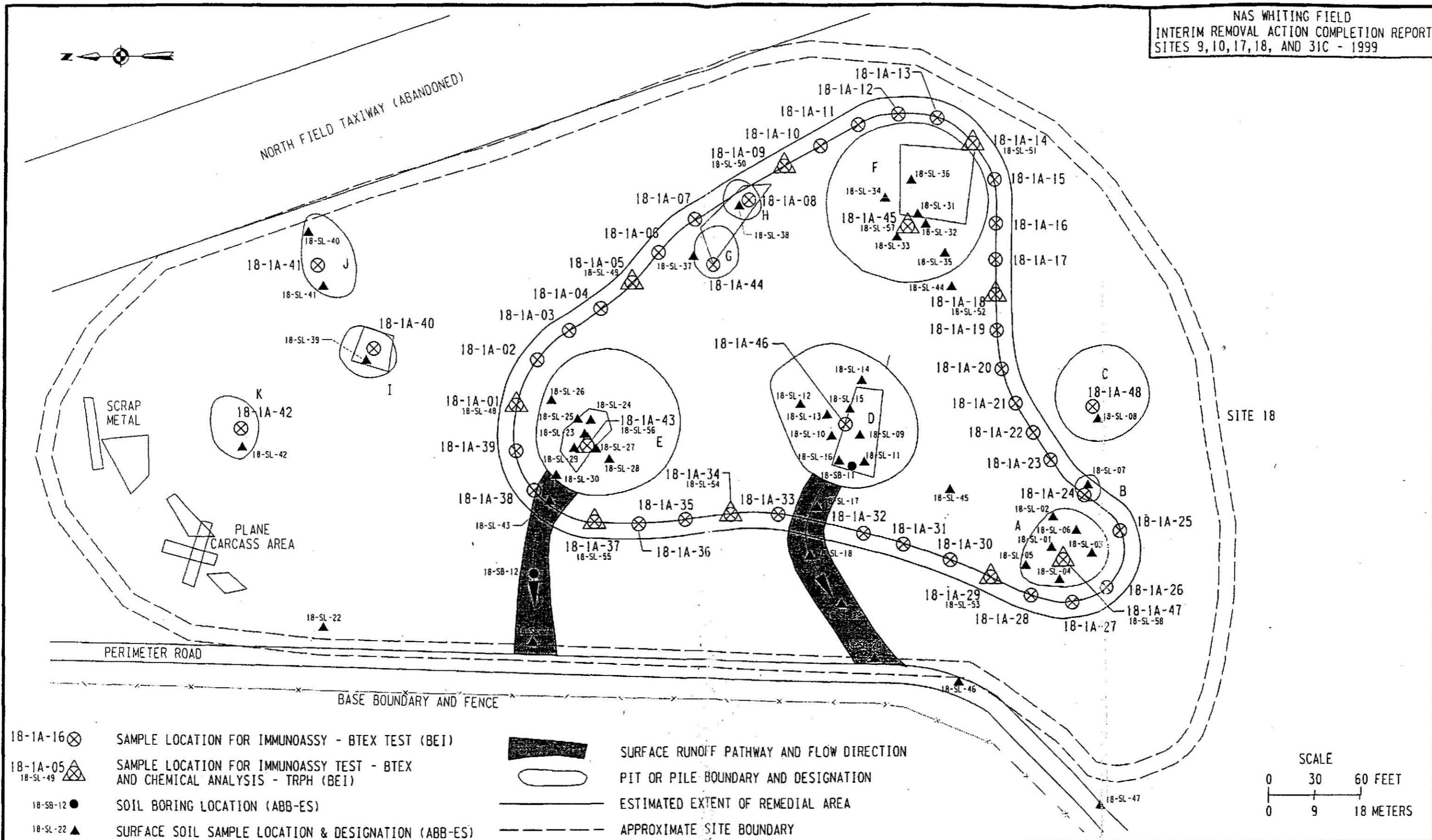


FIGURE 3-5
SURFACE SOIL SAMPLING LOCATIONS FOR TRPH AND BTEX AT SITE 18

Characterization samples were collected immediately down-gradient from surface sludge deposits to look for contaminants leached or washed from the sludge deposits, and from locations between sludge deposits to provide complete coverage where no sampling had been previously performed. These 35 samples were submitted for Level IV analysis based on the site-specific list of COCs. Laboratory results for these samples are listed in Tables D-9 and D-10 in Appendix D, and locations are shown on Drawing 419-DD-005 in Appendix A.

Three additional screening samples were collected from a remote-area sludge drying bed northwest of Site 31C at the intersection of Perimeter Road and the paved road to the sewage treatment plant (Figure 3-6). The samples were analyzed for the TAL for metals. Laboratory results indicated no contamination in excess of the residential direct-exposure soil SCTLs. Table D-17 summarizes the results, and locations are shown on Figure 3-6.

Eighty-two samples were collected from the bottom and sidewalls of excavations where soil contamination was above residential direct-exposure soil SCTLs. All results for excavation-confirmation samples were below the SCTLs. None of the 58 supplemental characterization samples contained contaminants above the residential direct-exposure soil SCTLs.

4.0 CONSTRUCTION QUALITY CONTROL

Bechtel provided construction quality control by conducting inspections of subcontractors at various points during the removal activities, as identified in the site-specific Addendum to the Quality Control Program Plan (Bechtel 1998b). Site-specific inspections were conducted during excavation, site restoration, workmanship, and waste management activities. No deficiencies were observed during these inspections.

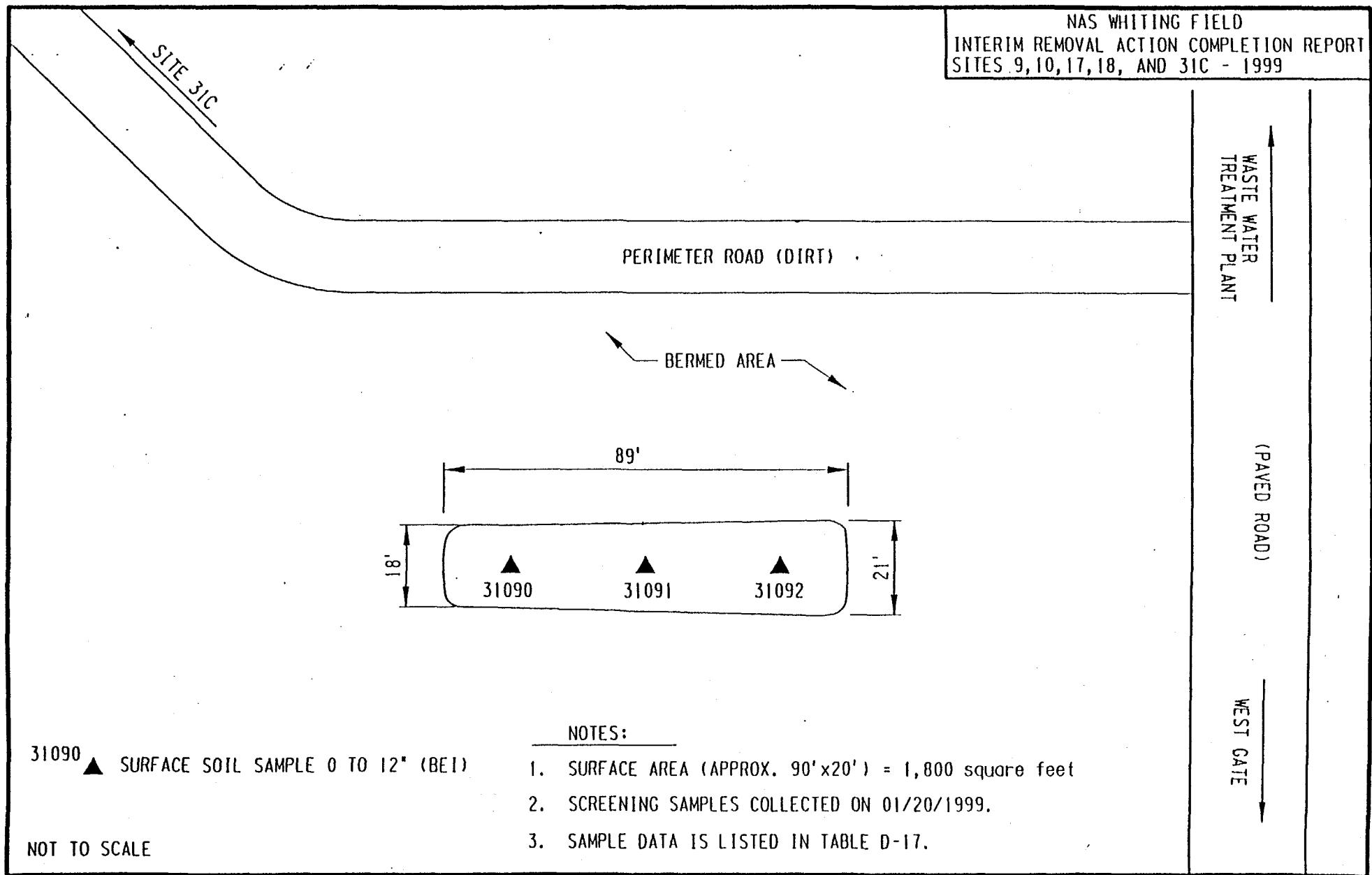
4.1 FIELD CHANGE NOTICES

No change orders were issued during the construction restoration activities.

5.0 FINAL CONSTRUCTION INSPECTION

A final construction inspection took place on 30 March 1999. Present for the inspection were representatives from Bechtel and from NAS Whiting Field public works and environmental departments. No deficiencies or outstanding punchlist items were identified by Base personnel during this inspection.

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FIGURE 3-6
SCREENING SAMPLE LOCATIONS AT SITE 31C REMOTE AREA

REFERENCES

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- FDEP (Florida Department of Environmental Protection), 1998. Letter from James H. Cason, P.G., dated 27 April 1998.
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